

FLIGHT

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ENGINEER
&
AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

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DIARY OF FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in the following list:

Feb. 9 ...	Lecture, "The Napier Lion Engine," by A. J. Rowledge, before Cambridge University Aë.S.
Feb. 16 ...	Lecture, "Aerial Manœuvres and Stability," by Prof. L. Bairstow, before Cambridge University Aë.S.
Feb. 17 ...	Lecture, "The Handley Page Wing," by F. Handley Page, before R.Aë.S.
Feb. 20-22	Aero Club of France Grand Prix
Feb. 23 ...	Lecture, "Possible Developments in Aircraft Engines," by Lieut.-Col. H. T. Tizard, before Cambridge University Aë.S.
Mar. 3 ...	Lecture, "Airship Fabrics," by J. W. W. Dyer, before R.Aë.S.
Mar. 3 ...	Lecture, "Parachutes," by Maj. T. Orde-Lees, before R.Aë.S.
Mar. 9 ...	Lecture, "The Artificial Control of Weather," by Sir Napier Shaw, before Cambridge University Aë.S.
Mar. 17 ...	Lecture, "Flying Boat Construction," by Capt. D. Nicholson, before R.Aë.S.
Mar. 20-22	Aero Club of France Grand Prix
April 13-20	Monaco Seaplane Meeting
April 20-22	Aero Club of France Grand Prix
June 1 ...	Entries Close for Schneider Cup
Sept. 30 ...	Provisional Date for Schneider Cup

EDITORIAL COMMENT



IMPELLED by the near translation of Mr. Churchill to the Colonial Office, the *Morning Post* has returned to its pet theme of abolishing the R.A.F. as a separate Service and reconstituting the R.N.A.S. and the R.F.C. The arguments it adduces to bolster up its reactionary case are almost humorous, or would be if they were not pathetic. It believes that "the naval and military authorities regard the incorporation of the aerial arm into the two fighting Services as essential." "In the conduct of war it is an elementary axiom that all arms—cavalry, infantry, artillery, engineers, and all the rest—must be placed under one supreme command, in order that the whole of the forces available may be directed to one end at one time." "That the Air Service is an auxiliary arm is surely indisputable." And so on, through a whole column of false premises and equally false logic. We suspect that the military correspondent of the *Post* has a hand in all that, and that his famous luncheon parties have lately led him amongst the more crusted fossils of the War Office, who, over the liqueurs, have impressed upon him that this upstart young Service must be nipped in the bud—that it must never be allowed to blossom into full flower.

However that may be, it is unfortunate that so usually responsible an organ of opinion as the *Morning Post* should be taking the line it is. There is nothing at all in the arguments adduced to show cause why the reactionary change should be made. Of course a certain number of naval and military "authorities"—including Col. Repington, no doubt—regard it as essential that the separate Air Service should be split up again. But the mere fact that they so regard the matter does not necessarily make it "essential." That is a question which can only be decided upon the whole of the evidence, and the weight of the latter is very clearly in favour of things as they are.

We agree with the "elementary axiom" stated by our contemporary, and so far as our recollection serves us, neither we nor any other critics of the split Air Service have ever denied it. We have gone farther, and have consistently maintained that air formations operating with fleets and armies must always be

under the orders of the commander-in-chief for operations, even though administratively they may belong to a separate and independent Service. The same must obtain when detached naval units are operating with the army, or when detachments of troops are embarked to assist in naval operations. Let us put a case to our contemporary. In 1896, the present editor of the *Morning Post* accompanied the force which, under Lord Kitchener, was operating up the Nile against the Khalifa. Working with that force were certain gunboats, which did excellent work against the enemy. These gunboats were officered and manned by the Royal Navy, but they were under the operation orders of the military commander-in-chief. Like air squadrons working with an army, they carried out the task assigned to them in their own way, but the fact remains that they were, with their entire *personnel*, a part of the army, except administratively. It did not appear to occur to anybody at the time—even to Mr. Gwynne—that it was anomalous that the Navy should be a separate Service, nor was it the opinion of naval and military authorities that the Navy should be incorporated into the Army. The argument equally applies to the Air Service.

The Air Service is *not* an auxiliary arm. It is as separate and distinct in its principal functions as are the Navy and the Army. Units of the air service can be auxiliary to fleets and armies, in the same way that the Nile gunboats, carrying out warlike operations against an enemy ashore, were auxiliary to the Army. But the fact does not make the whole Service an auxiliary arm in either case.

A Restricted Vision

In a very able letter to *The Times*, Mr. Holt Thomas puts his finger on a weak spot when he complains that it is loose thinking and a failure to envisage the problems of the future clearly, to talk about aircraft, or air services, as being "auxiliary" to land or sea forces, or to picture an Air Ministry simply in the position of providing these other Services with the machines they require. We know, but always fail to realise, that an Army or a Navy without the Air would be hopelessly outmatched. "This seems to me," he says, one of the perils of the present position. There has been no clear visualisation of the respective rôles in the future of sea, land and air forces; or, more particularly, of how they will interact one with the other, and how they can be welded into one great striking machine rather than blunder along separately, each in its own compartment. There is sometimes an almost total lack of any real grasp of what the great air strategy of the future may imply."

That is the whole trouble. The reactionaries are utterly incapable of realising that what the conquest of the air has brought about is not the addition of another arm—a long range gun, as it were—for the use of the existing Services, but a completely new factor in the greater problems of offence and defence—a factor which has an even more important bearing upon those problems than the discovery of steam navigation with its widening effect on sea and land strategy. We shall get nowhere until the full realisation of what the air and air power mean has been grasped by those who direct the policy of the Government or who have their share in the moulding of that public opinion without which even Governments cannot act. As we have said, the chief

complaint is that of restricted vision, which prevents people from seeing any farther ahead than tomorrow—of the probable events of a month hence they have no sense of vision. It is this which is at the back of all the reactionary talk—this and the quite understandable desire of a few senior officers of the older Services to squash the aspirations of one that is new.

A Separate Air Minister

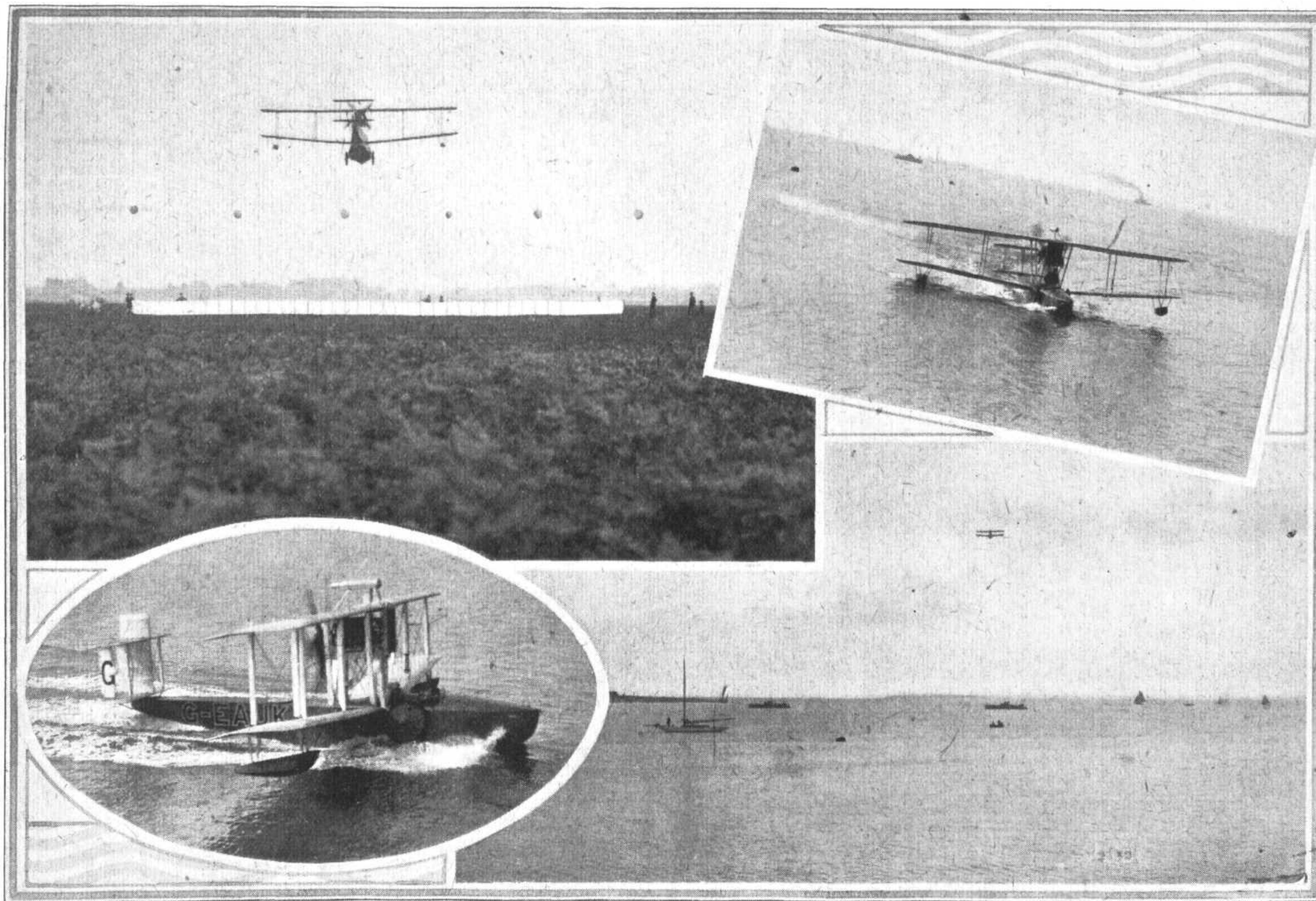
One good thing all the argument and counter-argument is doing, and that is to focus attention upon the question of the future control of the Air Ministry. *The Times*, we are glad to see, is throwing the whole weight of its powerful influence on the side of separating the offices of Secretary for War and for Air. It points out with considerable force that the duality of office necessarily leads to a brake being applied to the future of civil aviation. While *The Times* gives every credit to Mr. Churchill for having tried to overcome this fatal tendency of his dual authority, it argues that no one man at the head of two great Departments of State can control the tendencies which their association sets in motion, and the result of the combination under one Minister of the War Office and the Air Ministry has been inexorable. The military side of aviation has throughout been regarded as of paramount importance. That is perfectly true. If we look at the current air estimates we see that nearly a million and a quarter is to be spent on the establishment of a training school at Halton. The same estimates show a vote for civil aviation of £900,000, of which a third has been saved!

However, there is really no need to pursue the argument farther. We have discussed the question from every angle of view on many occasions since the announcement was first made that the two offices were to be combined, and have nothing to add to what we have already said—save and except this, that, able as Mr. Churchill has shown himself to be and well as he has succeeded in carrying on his two offices—we are speaking comparatively—there can be no question but that the experiment has been a failure. What would have happened had a less brilliant man than the present Secretary of State been at the head of the two Ministries we do not care to think. Civil aviation is in bad enough case as it is. What it would have been under other circumstances does not bear contemplation. The time is ripe and the opportunity present to make the essential change which will give us a separate Air Minister, in accordance with what were stated to be the views of the Government themselves when the Air Force Act was passed by Parliament. *It must be done.*

An Important Invention

In another part of this issue of *FLIGHT* we describe and illustrate a new automatic stabilising device for aeroplanes, the invention of M. Aveline, which has been extensively tested by Messrs. Handley Page, and which, so far, has given all the results anticipated. A machine fitted with the Aveline invention will literally fly itself for hours—the pilot has practically little to do but to take it off the ground, steer it, and land it at the end of his flight. Everything else is done for him.

It is quite clear that, unless there is some inherent disability yet to be discovered after further tests, this is only to be described as an epoch-making invention. Indeed, as the perfecting of the internal-



THE VICKERS "VIKING" AMPHIBIAN: Some "snaps" taken during the recent Air Ministry Trials. The machine is shown, in the top left-hand corner, clearing the balloons in the landing test, and on the right, manoeuvring on the water. Below it is seen taxiing on the water (left) and in full flight (right).

combustion engine made flying possible at all, so this new stabilising invention will—with the reservation we have already made—go far to make flying practically safe and as secure as riding in a train. There is no end to the possibilities of the aeroplane when the human equation has been removed from its operation. The flight from England to Australia, for instance, need impose no more actual physical and mental strain upon pilots than the navigation of a ship over the same voyage would do. The crossing of the Atlantic will become a mere "joy-flip" when automatic control is allied to that greater measure of reliability which the developments of the immediate future will bring in their train.

Of course, the device of M. Aveline is far from perfect yet. It weighs, we understand, some 300 lbs. This might be a serious matter in the case of commercial services in which all the carrying capacity must be taken advantage of to secure a profit on the enterprise. But the beginning is there. The device actually does its work, and that for the moment is what matters most. There can be no doubt at all that, like everything else that ever was invented, it can be improved upon and brought down to within reasonable commercial weights. Even if it could not, the improvements which are taking place now in the lifting capacity of planes and the growth of the power output of aero-motors are helping to make the question of weight carried secondary to that of facility of control and absolute safety of flight. We have already gone a long way beyond the days when the pilot debated whether or not he would carry an extra pair of goggles because of the added weight it would mean. So also are we progressing beyond the stage at which an extra hundredweight or so is of vital moment. With all its present comparative crudity, we regard M. Aveline's invention as a most important landmark in the history of flight.

The "Big Ship" Controversy

The discussion of the subject of the big ship *versus* the submarine still rages, but it cannot be said that very much extra light has been shed upon the question. The most notable contribution during

the past week has been that of Admiral S. S. Hall to *The Times*, in which he sums up his conclusions. He thinks that a strong case is made out for the appointment of a Minister of Defence, who could see what will not interest Naval, Military and Air Ministries in watertight compartments—that provision of air supremacy first and foremost would abolish all permanent defences at home and abroad; give us a means of competing with attacks on sea trade; be of considerable use commercially on a great many routes in peace time; relieve us of all fear of a vigorous air offensive on these islands or any of our possessions, and form a fine reserve for the army of pilots, observers and air mechanics that will inevitably be required in the next war.

We agree the thesis, but the question of a Ministry of Defence is a difficult one to envisage properly. It is doubtful to the point almost of impossibility whether any one man could grasp all the technical aspects of defence and offence which such a Minister would be required to deal with. If we could secure a sort of superman—not one of the Geddes family—to fill such a post, all might be well. But we get our Ministers from among very ordinary, even mediocre, people, and the trouble is that a Minister of Defence would necessarily be as completely in the hands of his advisers as any other. He would be subjected to all the arguments, all the pleadings, of specialists in their own form of warfare, each of whom would assure him that there is but one road to safety, and that that lay through the arm or Service with which that particular specialist happened to be associated. We are not sure, therefore, that salvation is to be found in a Ministry of Defence. Education is the real remedy—education through the medium of a real Imperial General Staff, representing all Services and all arms—a General Staff which will sit down to the conference table with a perfectly open mind regarding the ways and means of defence, but with a complete and intelligently-founded appreciation of the larger strategy of the next war. When we have got that we can proceed with plans for a Ministry of Defence. Until then we have grave doubts as to the feasibility of the idea.

THE LONDON-CONTINENTAL SERVICES

FLIGHTS BETWEEN JANUARY 16 AND JANUARY 29, INCLUSIVE

Route†	No. of flights*	No. of passengers	No. of flights carrying		No. of journeys completed†	Average flying time	Fastest time made by	Type and No. (in brackets) of Machines Flying
			Mails	Goods				
Croydon-Paris ...	12	5	4	6	8	2 3	Breguet F-CMAH (2h. 7m.)	B. (5), G. (1), Sa. (1), Sp. (2).
Paris-Croydon ...	16	16	7	11	10	2 58	Breguet F-CMAC (2h. 19m.)	B. (5), G. (1), Sa. (1), Sp. (3).
Cricklewood-Paris ...	2	2	2	2	2	2 21	Airco 9 G-EAUI (2h. 15m.)	A.9 (1).
Paris-Cricklewood ...	2	—	1	1	1	2 50	Airco 9 G-EAUI (2h. 50m.)	A.9 (1).
Croydon-Brussels ...	4	2	3	3	2	1 47	Martinsyde G-EAWE (1h. 45m.)	A.4 (3), Martinsyde (1) for Warsaw.
Brussels-Croydon ...	3	—	3	3	3	3 10	Airco 4 O-BAIN (3h. 5m.) ...	A.4 (3).
Totals for two weeks...	39	25	20	26	25			

* Not including "private" flights.

† Including certain journeys when stops were made *en route*.

‡ Including certain diverted journeys.

A.4 = Airco 4. A.9 = Airco 9 (etc.). Av. = Avro. B. = Breguet. Br. = Bristol. Bt. = B.A.T.
F. = Fokker. Fa. = Farman F.50. G. = Goliath Farman. H.P. = Handley Page. N. = Nieuport. P. = Potez.
Sa. = Salmson. Se. = S.E. 5. Sp. = Spad. V. = Vickers Vimy. W. = Westland.

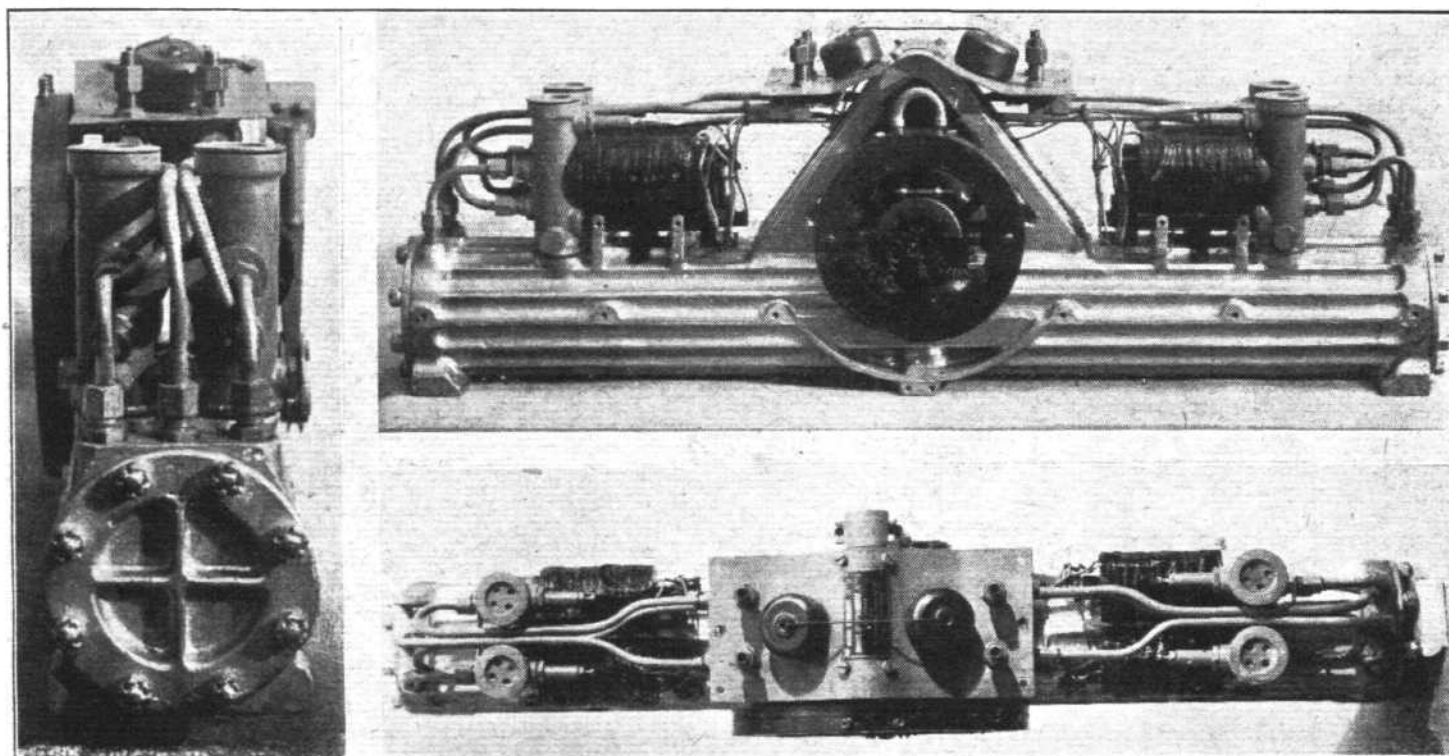
The following is a list of firms running services between London and Paris, Brussels, etc., etc.:—Air Post of Banks; Co. des Grandes Expresses Aériennes; Handley Page Transport, Ltd.; Instone Air Line; Koninklijke Luchtvaart Maatschappij; Messageries Aériennes; Syndicat National pour l'Étude des Transports Aériens; Co. Transaérienne.

THE AVELINE "AUTOMATIC PILOT"

FROM the earliest days of flying, inventors have occupied their minds with mechanical apparatus whereby the equilibrium of an aeroplane could be maintained without the aid of the pilot. One of the first, and most obvious, solutions of this problem was the pendulum, and inventions out of number utilising the pendulum principle have been patented. Some of these have been very ingenious, but when reduced to elementary principles have proved to be but some form of pendulum gear after all. Now the pendulum control is taboo on account of the fact that, although under certain conditions it will do what is required of it, it suffers from the disadvantage that it is acted upon by centrifugal force and by acceleration. This results in incorrect readings when the instrument is used as an indicator, and may mean a crash if the pendulum is used for operating, directly or indirectly, the controls. As a variation of the pendulum type of stabiliser, gyroscopes have been suggested, and several types have in fact been made and have proved to work satisfactorily. Perhaps the best-known of gyroscopic stabilisers is the Sperry, an American invention, which was used with success on several machines, notably large flying boats. Although this instrument worked very well, it never came into general use, probably because a gyroscope is, at the best of times, a delicate piece of machinery likely to get out of action. Moreover, the gyroscope with its

machine is electric, part pneumatic, and part aerodynamic. The pendulum portion, which is only partly to be regarded as a pendulum, consists of an inclinometer in which the fluid is mercury. This mercury is contained in a disc with a narrow circular groove, and serves to make and break an electric contact which operates the valves that admit compressed air to the air cylinder whose pistons actuate the control cables. A reference to the accompanying diagram should help to give an idea of the fundamental principles involved. This diagram, by the way, is not meant to represent the actual mechanism except in so far as concerns elementary principles, being neither to scale nor representing in component details the actual machine. It has been drawn solely in order to assist in fixing ideas, and deviates in many respects from the machine itself. We have thought this would form a better explanation of the idea of the invention than a more accurate and complicated set of drawings of the actual details, and presently we shall attempt to indicate wherein the machine itself differs from the diagram.

Having made this proviso, one may proceed to a description of the apparatus. To begin with the inclinometer, and taking first that for *aileron* controls (there is a separate one for the elevator). This consists of a fibre disc in which is a circular groove approximately half filled with mercury. Passing into



THE AVELINE STABILISER: Elevation, side view and plan

attendant servomotors and other paraphernalia weighs a good deal, and this, coupled with the various complications, has probably prevented the Sperry gyroscopic stabiliser from becoming as popular as it otherwise would have done.

Recently a form of "automatic pilot" has been introduced in this country, in which the pendulum principle is involved, but in which the objectionable features of the pendulum control have been avoided, or rather countered. This machine is the invention of a young Frenchman, M. Georges Aveline, who has succeeded in forming a company for exploiting his patents in this country. This firm is established as Automatic Controls, Ltd., with offices at 19, Regent Street, and at the present moment Messrs. Handley Page, Ltd., are carrying out a series of practical tests of the invention at their Cricklewood aerodrome. We understand that previously the "automatic pilot" has been tested by Air Ministry pilots, but the Handley Page tests are the first to be carried out by a private firm. During a series of tests by Major H. G. Brackley, D.S.O., the well-known H.P. pilot, the Aveline stabiliser has functioned very well indeed, and although there are still minor adjustments to be made the invention has already proved extremely promising.

The Principle of the "Automatic Pilot"

As has already been mentioned, the Aveline stabiliser employs a form of the pendulum principle, and part of the

this circular groove, and a small distance above the level of the two ends of the mercury, are two electric contacts while a third contact is placed at the bottom of the disc. To these contacts are passed wires from a 4-volt electric battery. In the actual machine one only is employed, but in order to keep the wiring diagram as simple as possible we have shown a battery for each side. It will now be seen that if the disc is tilted the mercury will rise on one side, thus closing the electric circuit on that side. The relay current of 4 volts on being closed actuates a solenoid switch, which closes a stronger circuit of 12 volts. This in turn actuates the valve mechanism of the working cylinder, which is supplied with air from a container. Two turbine pumps running at 2,000 r.p.m. keep up a pressure of about 50 lbs. per sq. in. in the air container. These two pumps are driven by two windmills, mounted under the front portion of the fuselage.

Suppose the left wing of the machine is tilted downward by a gust or through some other cause. The mercury will then rise in the left-hand side of the disc, and will make contact with the left-hand circuit. This closes the left-hand 12-volt circuit, and the solenoid shown at the left end of the working cylinder closes the exhaust valve and opens the inlet valve, thus admitting air from the container to the cylinder. The pressure of the air forces the piston to the right, and as the rigid connecting rod is provided with a rack engaging with the teeth of the quadrant above it, the quadrant is turned

anti-clockwise. Secured to the same spindle as the quadrant, and projecting downwards from it, is a lever (shown dotted) to which are attached the *aileron* cables. It will now be seen that as the pistons and connecting rod travel to the right the quadrant and the lever behind it move also to the right, pulling down the port *aileron* and thus righting the machine. This, briefly, is the principle of the mechanism, and later we shall indicate detail differences between diagram and actual machine.

The Original Feature

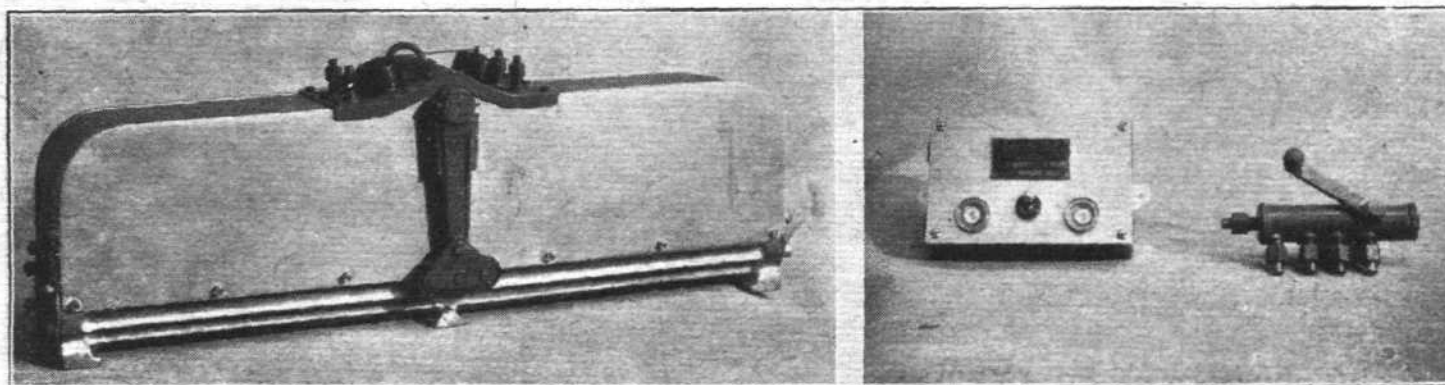
Hitherto the stabiliser has not shown any very great originality. All its components have been used or suggested before. We now come to the feature which separates the Aveline stabiliser from all others with which we are acquainted. Let us return to the diagram once more. If we suppose that the pilot of the machine does a flat left-hand turn, it will be seen that centrifugal force would send the mercury up in the right-hand side of the disc, indicating that the machine is down by the starboard wing when, as a matter of fact, she is perfectly level, merely doing a flat left-hand turn. In other words, the mercury is acting precisely as would a pendulum. In order to counter this tendency to rise and fall with the action of centrifugal force, M. Aveline has had the brilliant idea of letting air pressure work against centrifugal force, thus keeping the mercury level. This has been done by the very simple means of fitting to each wing tip a Venturi tube. The Venturi tube on the port wing tip is connected to the right-hand end of the mercury and vice versa. In other words, the pipe leads from the tubes are crossed. Between the two points where the tubing enters the circular groove the latter is closed. Now the action of the Venturi tubes is to cause a

Some Interesting Details

The foregoing is a broad outline of the action of the Aveline stabiliser. It will have been observed, however, that so far nothing has been said regarding the method of returning the pistons of the working cylinder to zero when the machine begins to right itself. As shown in the diagram, the inclinometer, or disc with the mercury, tilts with the machine. When, therefore, the machine begins to right itself there is nothing to prevent the pistons from travelling to the end of their stroke until the machine has "overshot the mark," and makes contact on the opposite side. This would give rise to oscillations, and to avoid these the actual arrangement of the apparatus is different from that shown in the diagram. Instead of being mounted on the machine itself, the inclinometer is mounted in front of the working cylinder, its axis carrying a quadrant pointing upwards and engaging with a smaller quadrant on the same pivot as that of the main quadrant.

There is, therefore, a differential movement between the mercury disc and the main quadrant, so that when the quadrant turns in an anti-clockwise direction the mercury disc turns in the opposite direction. The action is somewhat difficult to explain in words, but the two auxiliary quadrants are shown in dotted lines on the diagram, as is also the mercury disc in its proper position. The result of the differential movement is to shut off the air and so to stop the travel of the pistons.

A similar arrangement is provided for the elevator control, but here, in addition to the differential movement of the disc and quadrant, the "setting" of the disc is also under the control of the pilot. This is necessary in order to trim the machine. For any one setting the controls will keep the



THE AVELINE STABILISER: On the left, a rear view of the casing over the working cylinder, showing the crank lever to which the control cables are attached. On the right, the relay tell-tale lamps and one of the control valves by means of which the pressure, and consequently the power of the control, is regulated. When the lever points forward the control is in gear, and turning the lever back throws the control out of gear.

depression above the mercury. When, therefore, the machine turns to the left, the starboard Venturi tube is moving faster, causing a greater depression over the left branch of the mercury. The port Venturi tube, on the other hand, is moving slower, and consequently the depression is smaller on the right-hand side. Both these differences in pressures tend to prevent the mercury from being raised into the right-hand branch of the circular groove and there make contact and set in motion the mechanism which would pull the starboard *aileron* down. Put differently, the action of centrifugal force is counteracted by the aerodynamic forces brought into play by the Venturi tubes.

The set for the elevator is similar in general principle, with, however, one important difference. Here only one Venturi tube is employed, the opening for the second one communicating with the atmosphere. A few minutes' consideration will make clear the reason for this arrangement. When the machine is travelling along at normal flying speed there is a slight depression, depending upon the speed of the machine, above the corresponding end of the mercury. The effect of this is to raise the mercury into the forward end of its groove, and as this condition represents the zero line, or plane of reference of the elevator system, the two metal contacts are so placed as to be just above the ends of the mercury. In other words, the normal level of the mercury is at an angle with the horizontal. If the machine is flying along at, for instance, 60 m.p.h., and the engine stops, the speed will drop. Consequently the depression above the forward end of the mercury will decrease, and the mercury will fall, rising at the other end until it makes contact at the lower end, and thus sets in motion the gear for pulling the elevator down until the speed, coupled with the downward slope of the machine, breaks contact and the machine proceeds in a glide.

machine at one speed. If, therefore, it is desired to fly at a different speed, the pilot turns a handle in his cockpit, which—via a Bowden cable, worm and sector—alters the relative position of quadrant and disc. In other words, a new reference plane is provided, which forms the zero or normal datum line to which the controls return the machine every time it has deviated from it through any cause.

Adjustment of the Stabiliser

It has already been mentioned that the two air pumps keep up a pressure of in the neighbourhood of 50 lbs. per sq. in. in the air container. If this pressure were to be admitted to the working cylinder the controls would operate very brusquely and the machine would "hunt." In order to avoid this a small valve is provided in the pilot's cockpit by means of which the pressure of the air admitted to the working cylinder can be regulated to a nicety. There is no need to go into a detailed description of this valve, suffice it to mention that it regulates the air by means of a disc with holes of different sizes, ranging from 1 mm. to 4 mm. in diameter. On the barrel of this valve is a small lever which, by means of a cam and internal pistons, covers and/or uncovers the four tubes issuing from this small cylinder. When the lever is pointing forward the control is in operation, while by turning it back the control is out of gear. There are two of these levers, one for elevator and one for *ailerons*. Thus the pilot can throw either or both out of gear at will. For instance, he can control the elevators himself and have the stabiliser work the *ailerons* only. Or he can set the elevator adjustment to any angle of climb or to straight flight, and control the *ailerons* himself. Finally, he can throw the entire mechanism out of gear by means of a single lever, when he has straight-through control as if the stabiliser were not fitted at all.

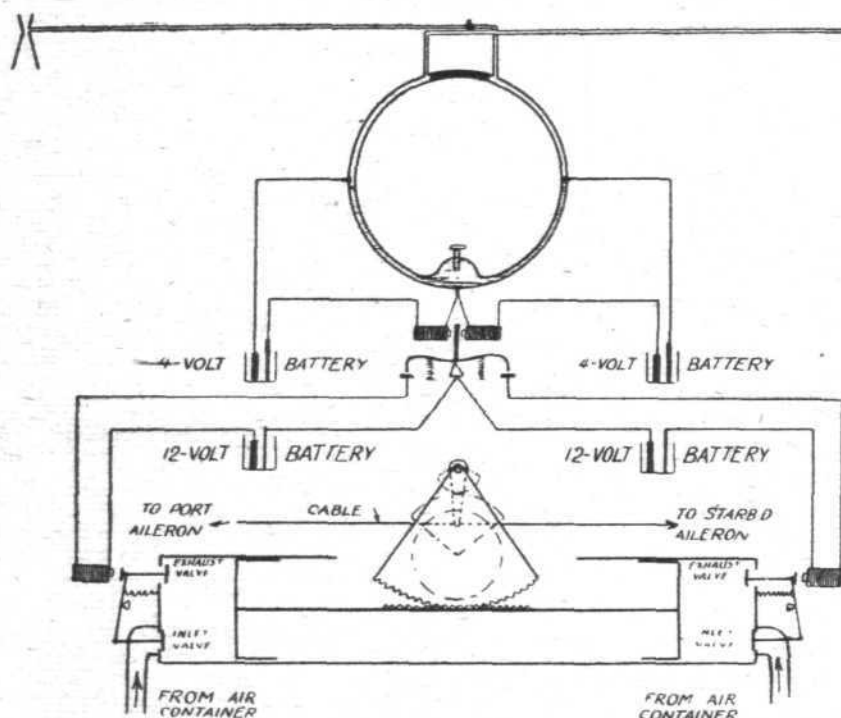
Using the Stabiliser as an Indicator

Connected up with the relay electric circuit are two pairs of electric lights, one pair for the *ailerons* and one for the *elevator*. When the stabiliser is working these lights burn as soon as contact is made by the mercury. For instance, if the left wing tip drops, the mercury makes contact on the left-hand side, and the little lamp on the left lights up and continues to burn until the circuit is broken. Thus the pilot can see all the time what is taking place. For instance, if the machine commences to "hunt," i.e., overcorrecting the elevator control, the front and rear lamps of the indicator will light up alternately. When both go out the pilot will know that balance has been restored, and that the machine is flying at the angle and speed for which it has been set.

If the two levers are swung back, the control is not working, but if the switches are left "on," the light will still continue to act, and the inclinometer and relay circuit are working as indicators merely.

The Actual Working Cylinder

It has been mentioned that the actual working cylinder of the machine is somewhat differently arranged from the arrangement shown in the diagram. For instance, the valves are not in the cylinder heads, but above, near the end of the



The Aveline Stabiliser: Diagrammatic sketch of the elementary principles of the control. The inclinometer is shown above the control quadrant. On the actual machine it is mounted on a smaller quadrant engaging with a still smaller one, as indicated by the dotted lines.

cylinder, as will be seen from the photograph. Also, normally all valves are closed, and when air is admitted to one end of the cylinder the exhaust valve of the opposite end is opened. When all the valves are closed and the pistons are travelling towards their central position, a valve is opened above the cylinder and the air is allowed to pass from the end towards which the piston is moving to the opposite end, where it fills the space vacated by the retreating piston. When this happens, therefore, there is only the frictional resistance of the pistons and the air through the bypass tube to overcome. To have shown all this piping would have made the diagram complicated, and we have preferred to keep the diagram simple and to point out the difference between it and the actual arrangement.

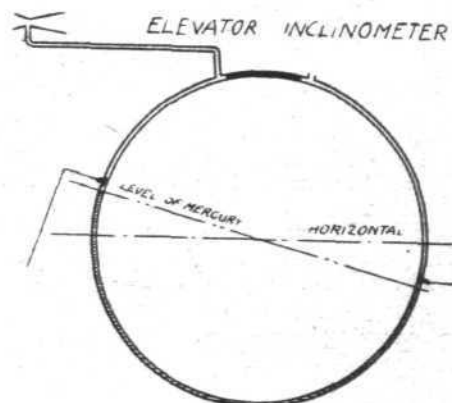
The Stabiliser in Practice

There are numerous other minor details of the stabiliser to which we should have liked to make reference, but space does not allow of doing this. Sufficient has, we think, been said to indicate the manner of working and to show the thorough way in which the inventor has grasped the problems to be solved. That the machine is absolutely perfect as yet is not, we think, claimed, but such difficulties as still exist are of a very minor character and will doubtless soon be overcome. For instance, it will be realised that when a machine fitted with the stabiliser meets a "head-on" gust, the Venturi tube will raise the mercury until it makes contact with the

"up-elevator" circuit, thus making the machine swoop. This is, however, only what happens in any longitudinally stable machine, and if the swoop be too great, the differential movement of the disc will break that circuit and close the "down-elevator" circuit.

That the invention is of more than ordinary interest from a technical point of view will, we think, be generally admitted. What are its practical applications? In the first place the weight of the apparatus is considerable. Even granted that by future development and simplification the weight can be got down to, say 150 lbs., this will still mean that the equivalent of one passenger is expended on carrying the device. On the London-Paris journey this will mean, at the present fares, a loss of £18 18s. on the double journey. This is a serious consideration, and unless the device can save the pilot from a considerable amount of strain it will not be tolerated. That it will do so is more than probable, and a fact which will have to be kept in mind when trying to form an opinion of the value of the device is that it is probably not on very many journeys that the full complement of passengers or goods is carried. In that case there is no loss due to carrying the device, other than a small one in petrol consumption, and that, probably, is negligible.

There is one sphere in which the stabiliser does appear to score heavily: that of flying in fog or clouds. Normally, when the pilot is in a cloud he has, after a time, very little notion of what is the attitude of his machine. For all he knows he may be flying around in circles, and usually the only indication he has is that his compass appears suddenly to have gone mad. As to how to get out of his difficulty he



The Aveline Stabiliser: Diagram of the elevator inclinometer. Here there is only one Venturi tube, the opening for the second one communicating with the atmosphere. The suction of the Venturi tube causes the mercury to rise in the forward branch, so that its normal level is at an angle to the horizontal.

is very much in the dark. If his machine is very stable he may be able to put all control central and get back to normal in this way. In the meantime, however, he may have got the machine into positions involving stresses which are approaching the danger mark. Here the stabiliser would score heavily. If a pilot approaches a cloud he can set his elevator adjustment to what he wants, either a steady climb or horizontal flight, and so long as he keeps on his compass course by steering with the rudder, he has the satisfaction of knowing that the machine is proceeding normally. Again, for flying at night the stabiliser would be invaluable, as it would relieve the pilot of all control except that of steering.

In the case of twin-engine machines also the stabiliser appears to be of advantage. If one engine cuts out all the pilot has to do is to give opposite rudder. The device looks after the lateral control, and it also puts the nose of the machine down to compensate for the loss of speed. Considering all the assistance which the stabiliser can give to a pilot, and keeping in mind that more often than not machines are flying with less than their full paying load, it appears that for fairly large machines at any rate it is well worth fitting. While for night flying it will prove a great boon. M. Aveline is to be congratulated upon his achievement in solving the conflicting problems and we wish him every success with his clever invention.

The Royal Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

EXTRACT FROM REGULATIONS OF THE MONACO MEETING, 1921, ORGANISED BY THE INTERNATIONAL SPORTING CLUB OF MONACO.

HYDRO-AEROPLANE CONTESTS. APRIL 13-20, 1921

(Under the Competition Rules of the Aero Club de France and the Regulations of the Fédération Aéronautique Internationale.)

April 15-16, 1921: MONACO-AJACCIO-MONACO (492 kilometres).—1st Prize: 40,000 francs. 2nd Prize: 12,000 francs. 3rd Prize: 8,000 francs.

Object of the Contest.—The object of the contest is to ensure the postal service between the South of France and Corsica. For this purpose, each competitor must pick up the mail at Monaco and deliver it at Ajaccio, where he must pick up the Corsican mail and take it to Monaco. Each competitor must be provided with a useful load of at least 200 kilos., and, if required, fly the course at a minimum height of 2,000 metres.

Regulations for the Contest.—The Monaco Control will be open each day from 6 a.m. to 6 p.m. Any competitor arriving at Monaco after 6 p.m. on the first day will be considered as having arrived on the opening of the control on the second day. The control will however be finally closed at 6 p.m. on the second day.

On his arrival at Ajaccio, each competitor must hand to the official appointed for the purpose a sealed bag weighing 1 kilo., which will have been given to him at Monaco to represent postal correspondence.

On his departure from Ajaccio, each Competitor will receive from the official another bag of the same weight, which he will hand on his arrival at Monaco to the Official appointed for the purpose.

Preliminary Test.—Before taking part in the contest, each competitor must carry out the following preliminary test in the Bay of Monaco:—

He must climb 2,000 metres in not more than 45 mins., carrying 200 kilos. of ballast, supplies, apparatus and regulation instruments. The weight of any passenger carried, in addition to the usual crew, may be deducted from the total weight of ballast. All machines must be provided with a wireless sending set of 500 watts. During this Test competitors must send a call by means of their wireless.

During the whole of the Contest—Monaco-Ajaccio-Monaco—competitors must carry the ballast, crew, supplies, apparatus, instruments and wireless set, as laid down for the preliminary Test.

Competitors will be timed as they pass in flight the starting and finishing line at Monaco. The Winner will be the competitor who completes the course, out and back, in the shortest time.

Entries.—Entry Forms, accompanied by the Entry Fee of 100 francs, which is not returnable, are received up to midnight, February 28, 1921, either at the International Sporting Club of Monaco, 10, rue Auber, Paris, or the Aero Club de France, 35, rue François 1^{er}, Paris. The following particulars must be given:—Name and nationality of the constructor of the machine, engine and floats. The name of the pilot and mechanic need not be given until the time of starting.

By entering, the pilots or principals agree:—

1. To be cognisant of and abide by the attached Rules and the Competition Rules of the Aero Club de France.

2. To be liable for all material or personal accidents, either to themselves, their employes, third persons, their machine or any other, personal or otherwise, either during trials or during the Competition, and to assure the Organising Committee of this in advance.

They must take out an insurance for this purpose, the Organising Committee declining all responsibility.

April 19, 1921: MONACO - CANNES - SAN REMO - MONACO (2 Circuits—284 kilometres). For Speed and Weight-Carrying Machines.

Prizes: Speed Machines—1st Prize: 12,000 francs. 2nd Prize: 8,000 francs. Weight-Carrying Machines—1st Prize: 12,000 francs. 2nd Prize: 8,000 francs.

The start will be in line on the water in the Bay of Monaco. Weight-carrying machines must carry 200 kilos. of ballast, and be provided with a wireless sending set of 500 watts. The weight of any passenger carried in addition to the usual crew may be deducted from the total weight of ballast. Competitors will start with supplies, tools, apparatus and regulation instruments.

Speed and weight-carrying machines may not take part in this Contest, unless at the time of starting they have attained a height of at least 3,000 metres in less than an hour in the former and 2,000 metres in 45 mins. in the latter category. These tests must be carried out at least two hours before the time of starting in the Contest.

Weight-carrying machines must have carried out the test having on board the necessary ballast, supplies, tools, apparatus and regulation instruments, together with the wireless sending set specified above.

Machines must have the same motor and the same lifting surface for both tests. The weight-carrying machines will compete in the morning and the speed machines in the afternoon. The conditions and entry fee are the same as for the Monaco-Ajaccio-Monaco Contest.

April 17 and 20, 1921. **Speed Contest:** MONACO-CANNES-MONACO - MENTONE - MONACO (about 125 kilometres).

April 17, 1st Contest; April 20, 2nd Contest.

Prizes for each Contest.—1st Prize: 6,000 francs. 2nd Prize: 2,500 francs. 3rd Prize: 1,500 francs.

The start will be made in line in the Bay of Monaco, the turning points will be passed in flight, and the arrival in flight in the Bay of Monaco. These contests are reserved for machines which on the day of starting have attained a height of at least 3,000 metres in less than an hour. Machines must have the same motor and lifting surface for both tests. The entry fee for the two contests is 200 francs, which will be returned to competitors taking part, 100 francs being returned for each contest. The entry fee is forfeited in the event of competitors not qualifying for the speed contest. The general conditions of entry are the same as for the Monaco-Ajaccio-Monaco Contest.

Greatest Speed over a Nautical Mile.—Each day between 11 a.m. and midday competitors, who have given notice the day before, may attempt to establish the greatest speed over a nautical mile for hydro-aeroplanes. This contest will be open from April 13 to 20, 1921, and a prize of 3,000 francs will be awarded to the holder of the greatest speed at the end of the Meeting. A sum of 5,000 francs, divided into eight prizes of 625 francs, will also be awarded to the pilots who establish the best performance each day from April 13 to 20, 1921, i.e., eight days and one prize for each day. The entry fee is 100 francs, which is returnable to competitors who have completed at least three attempts for the greatest speed from April 13 to 20. The general conditions of entry are the same as for the Monaco-Ajaccio-Monaco Contest.

Height Contests.—A Height Contest will be held April 13 to 20, 1921, and a prize of 3,000 francs will be awarded to the pilot who has reached the greatest height at the end of the Contest. A sum of 5,000 francs, divided into eight prizes of 625 francs, will also be awarded to the pilots who establish the best performance on each of the days April 13 to 20. Competitors wishing to make attempts for the Height Record must signify their intention the day before. The entry fee is 100 francs, which will be returned to competitors who complete three attempts during April 13 to 20, 1921. The general conditions of entry are the same as for the Monaco-Ajaccio-Monaco Contest.

Tests of Skill

(1) **Alightings.**—The Test consists of the following:—The pilot having stopped his engine at a height of at least x metres, will come down without re-starting the engine, and alight in an area indicated by four buoys.

The height x will be determined according to the atmospheric conditions, and will be intimated to the competitors by the Commissaires Sportifs before the commencement of the Test. It will not in any case be greater than 1,000 metres. The number of attempts allowed will be determined by the Commissaires Sportifs before the start and communicated to the competitors. The point of alighting will be the centre

of the area marked out by the four buoys. The winner will be the pilot whose machine stops definitely nearest the centre.

1st Prize : 800 francs. 2nd Prize : 400 francs. 3rd Prize : 300 francs. The entry fee is 100 francs, which will be returned to the Competitors taking part.

(2) **Destroying Balloons.**—The Test consists of the following:—For each machine, three balloons will be released at intervals of 30 seconds. The first balloon will be released one minute after the start of the machine. Each machine must carry a passenger in addition to the pilot, and the passenger will destroy the balloons as quickly as possible by means of a gun. Each competitor will be allowed ten minutes to destroy the three balloons. At the end of this time a bomb will indicate to the pilot that he must return to the starting place. The balloons will be similar to those used for meteorological purposes. Their lift will be determined before the Contest, according to the atmospheric conditions, and the information will be communicated to all competitors. The number of attempts allowed will be determined beforehand by the Commissaires Sportifs, and communicated to the competitors. The time will be taken from when the Commissaire Sportif gives the order to start (one minute before the first balloon is released) up to the time the competitor

crosses the finishing line in flight, after having destroyed the three balloons.

1st Prize : 500 francs. 2nd Prize : 300 francs. 3rd Prize : 200 francs. The entry fee is 100 francs, which is returnable to all competitors taking part.

Each machine will be allotted a number, which must be placed on each side of the fuselage and under the planes.

With a view to assisting the competitors as far as possible towards the expense of transporting their machines, a guarantee of 5,000 francs will be given at the end of the Meeting for each machine properly entered, which has arrived in due time, and completed at least 100 kilometres in one of the Contests. This guarantee will however only be given where a prize has not been won or if the total of prizes won does not reach 5,000 francs. In the latter case the amount will be increased in order to bring it up to the figure of the guarantee, namely, 5,000 francs. This guarantee will only be given in the case of machines which have come from a distance of 500 kilometres or more.

Entry forms for all of the above Contests may be obtained from the Royal Aero Club, 3, Clifford Street, London, W. 1.

Offices : THE ROYAL AERO CLUB,
3, CLIFFORD STREET, LONDON, W. 1.
H. E. PERRIN, Secretary.

NOTICES TO AIRMEN

Felixstowe Seaplane Station : Obstruction

1. **Obstruction.**—A temporary boom will shortly be moored in Harwich Harbour to the north-west of the Felixstowe Seaplane Station, in lat. $51^{\circ} 57' 0''$ N., long. $1^{\circ} 18' 30''$ E.

The boom will extend from No. 3 mooring buoy (situated at a distance of 2,080 ft., 310° from the red light on Felixstowe Pier) to No. 4 mooring buoy (situated at a distance of 2,600 ft., 311° from the red light on Felixstowe Pier).

Alternatively, the obstruction will be placed across the tide in a direction 50° from No. 3 mooring buoy, and will extend to a distance of 360 ft. approximately.

The lights for a vessel at anchor will be displayed from the boom during the hours of darkness.

This boom causes an obstruction to aircraft in that part of the harbour to the north of the seaplane station. Seaplanes should, therefore, land or take off outside this area.

2. **Authority.**—Admiralty Notice to Mariners No. 2030 of December 15, 1920. (No. 12 of 1921.)

Pilots' Licences : Compulsory Examination in Navigation

ALL applicants for a licence or for a renewal of licence as pilot will be required, as from April 1, 1921, to undergo a technical examination in navigation, as laid down by the Air Navigation Directions, 1919 (para. 3 (2)). This examination, hitherto waived, will be *viva voce*, and will be conducted by an Air Ministry Board.

A syllabus, compiled in the form of questions as a guide to candidates, is attached.* It is sub-divided into the following groups:—Definitions, Rules as to Lights, Rules as to Signals, Rules of the Air, Rules for Air Traffic on and in the Vicinity of Aerodromes, Regulations for Preventing Collisions at Sea, Articles of the International Air Convention, and Navigation.

The answers to questions 1 to 68 will be found in Annex D of the Convention relating to International Air Navigation, and those to questions 69 to 100 in the Articles of the Convention itself. The remainder are general navigation questions.

When instruments are required to solve a question they will be supplied by the Board of Examination.

When a paragraph of the Convention is referred to in a question by its number, the paragraph will be read to the candidate by a member of the Board.

Applicants for Private Pilot's Flying Certificates (Class A Licence) will be examined in questions 1 to 100 only; in the case of candidates for the Royal Aero Club Certificate the examination may be carried out, under arrangements to be made, by the Royal Aero Club.

The Convention relating to International Air Navigation is published by His Majesty's Stationery Office (price 1s.). (No. 13 of 1921.)

* This can be obtained upon application to the Air Ministry.

CORRESPONDENCE

The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.

THE R.A.F.R.

[2038] I should like to express my cordial agreement with the remarks contained in your leading article this week, upon the subject of the Air Ministry.

From the formation of the R.A.F. down to the present time, there has been a tendency, certainly apparent and probably real, to treat the Force as a branch of the Army. One has even heard the R.A.F. described as "a regiment." That this tendency is wholly detrimental to the best interests of the R.A.F. need not, presumably, be demonstrated in an aeronautical journal, but there is need for active propaganda upon the subject in political circles.

An Air Minister entirely unconnected with any other

Service is possibly our greatest need at the moment. But another point in connection with this matter also deserves attention at present, and that is the formation of what the daily newspapers insist in calling "the Territorial Air Force." This appellation appears wholly unfortunate, as it tends further to spread the identification of the R.A.F. with the Army. The word "volunteer," and, for the matter of that, the word "reserve," are common to both the senior Services. Why could not either or both of them be employed to describe the new branch of the R.A.F.?

L. FRANCIS JONES,
late R.F.C. and R.A.F.

Kensington, W., January 21.

The Napier 1,000 h.p. "Cub."

It is now several months since the first public reference was made to the new Napier aero engine. All that was announced then was that the new power plant would have 16 cylinders and was expected to develop about 1,000 h.p. During this week the daily press have published some highly attractive accounts of the "Cub," but allowance should be made for the usual lay press colouring, as the engine being built to the express order of the Air Ministry, it is not permissible to give accurate detail information concerning it at the moment. We ourselves are not permitted as yet to

publish a description of this latest triumph of British aero engine engineering, but readers of FLIGHT may rely upon receiving early information when the way is clear. In the meantime there can be no harm in mentioning those of the figures given in the daily which are reasonably accurate.

The engine, which was designed by Mr. J. Rowledge, who was, of course, responsible for the famous Napier "Lion," is a 16-cylinder of X formation, and on a recent test it developed considerably over 1,000 h.p., and its weight is not very much over 2 lb./h.p.

GERMAN DISARMAMENT

At last something definite has resulted from the Paris Conferences upon the enforcement of compliance with the terms of the Peace Treaty by Germany, and it remains to be seen whether it will be possible to bring our late enemies into line to foot the bill now presented to them. An accompanying document sets out the German infringements of the clauses of the Versailles Treaty, and gives the various dates by which compliance is demanded, June 30, 1921, being the latest date allowed. In this the following references occur to the subject-matter of aircraft:—

Aerial Clauses Infringements

I. Germany has not surrendered all the aeroplanes, hydro-aeroplanes, motors, balloons, hangars (to be dismantled, destroyed, despatched, or delivered (out of the country)), balloon accessories, wireless telegraph and photograph equipment, hydrogen factories and reservoirs, machine-guns and other aeronautical material (Article 202).

It may be noted with regard to the most important of this material there remain to be surrendered, in accordance with certain estimates, 1,400 aeroplanes and 5,000 engines.

II. Since July 10, 1920, Germany has recommenced aeronautical manufacture in spite of the decision taken by the Allied Governments at Boulogne on June 22, and she has attempted to export the material so manufactured in spite of the formal orders of the Commission of Control (Article 201).

III. Germany has refused to furnish the compensation demanded by the Allies for the seven (7) Zeppelins destroyed in 1919 (Article 202).

IV. Germany has not yet paid the sum of 25,000,000 marks still due as compensation for material improperly exported (Article 202).

V. Germany claims to have the right to utilise aircraft in her police formations (Article 198).

Decisions of the Allied Governments

I. The search for hidden material will be facilitated by the German Government, and the surrender provided for by Article 202 shall be finished before May 15, 1921.

II. Germany shall assure the execution of the decision of Boulogne, i.e., no manufacture or import of aeronautical material shall take place until three months after the date on which the I.A.A.C.C. shall declare that Article 202 has been completely complied with.

III. Germany must furnish the compensation demanded for the destruction of Zeppelins; the detail of such compensation will be fixed by a special contract.

IV. Germany must pay the sum of 25,000,000 marks referred to above before March 31, 1921.

V. Germany shall conform to decision C.A. 91-III of the Conference of Ambassadors, dated November 8, 1920, regarding the prohibition of the use of aircraft in police formations.

In addition, with a view to ensuring the application of Article 198 of the Treaty forbidding Germany to possess any military or naval aviation, Germany shall accept the definitions established by the Allied Powers which shall distinguish civil aviation from military aviation forbidden by Article 198. The Allied Governments shall assure themselves by constant supervision that Germany is fulfilling this obligation.

The Allies have repeatedly made allowances for the difficulties experienced by the German Government in carrying out its Treaty obligations. They are now giving a further extension of time, but they sincerely trust the German Government will not render it necessary for the Allies, confirming their previous decision, to consider the grave situation which will arise if Germany further persists in her default.

THE WRECK OF THE "R.34"

It is with the greatest regret we have to report the total wreckage of the "R.34," the rigid airship which made that historic voyage to America and back in the summer of 1919. Official details of the catastrophe are not, at the time of writing, available, the only official report from the Air Ministry so far being the following:—

"Owing to an accident during the night (Thursday) while engaged on a routine instructional cruise, the 'R.34' was partially disabled and was returning to her base at slow speed. No casualties occurred."

"'R.34' returned to her station at Howden after carrying out a normal service flight at 16.30 on Friday, January 28, and owing to the unfavourable change of weather and strong gusts of wind around the shed it was not possible to house her for the night, and she was therefore anchored in the open."

"Owing to the damaged condition of the ship and the gusty nature of the weather it was not possible to keep her under control during the night, and, unfortunately, the ship, to all intents and purposes, was wrecked."

It seems that during the instructional flight referred to weather conditions got very bad and fog made navigation somewhat difficult. From reports it would appear that whilst the watch was being changed over in the forward gondola, at about midnight, the car came into contact with the ground, presumably some hill. Naturally, some damage was done to the car and the engine was put out of action, and immediately after the rear gondola also struck the ground, with the result that the two engines in this car were similarly placed *hors de combat*. Fortunately the ship managed to rise out of further danger, and with only her two engines amidships available, put up a stiff fight against a freshening wind in an

effort to return home. By dawn she was some 12 miles out to sea, but managed to turn and slowly make a course to Howden, following the Humber. It is reported that "R.32" and destroyers were sent out to assist "R.34."

Her troubles were by no means at an end when she eventually arrived at Howden, for on landing—rendered exceptionally difficult with but two engines—she received many nasty bumps, which did not improve her already disabled condition. It having been found to be impossible to get "R.34" into the shed, she was taken to the mooring ground and secured on the three-wire system. As the evening closed the wind increased, and after several narrow escapes an extra strong gust apparently forced her nose to the ground, with the result that she rapidly began to break up.

It would seem, on the facts available, that this catastrophe has been helped by the policy of "penny wise and pound foolish," for there is little doubt that had the Station been properly equipped with a mooring mast, and various other handling gear, the cost of the installation would have been nothing as compared with the loss of a quarter of a million or so craft.

Much as this mishap is to be regretted, there is a certain amount of satisfaction in knowing that "R.36," which is being constructed by Messrs. Beardmore, is now on the eve of being completed, and was actually inspected by Lord Weir last Saturday. Fitted with a saloon and several other new features, suitable for the passenger and commercial purposes for which she is intended, "R.36" is slightly longer than her sister ship, "R.34."

In addition there is also "R.37," which is also well on the way to completion, at the Bedford National Airship Factory, in the hands of Messrs. Short Brothers.

Martlesham Heath—Re-union Dinner

THE Re-union Dinner for officers of the Aeroplane Experimental Establishment, Martlesham Heath, will be held at the Café Royal, Regent Street, London, W., on Friday, February 25, 1921, at 7 p.m. Air-Commodore H. R. M. Brooke-Popham, C.B., C.M.G., D.S.O., R.A.F., will be in the Chair. Tickets, price £1, can be obtained from Captain P. G. Robinson, Room A. 139, Air Ministry, Kingsway, London, W.C.

Italian Fixtures for 1921

A PROGRAMME for this year has been issued by the National Aeronautical Federation of Italy which promises: (1) Seaplane contests on Lake Garda in May; (2) circuit races at Brescia, during the Brescia motor event week; (3) race Lugo-Trieste-Trento-Lugo, June 10; (4) Schneider cup contest (Venice or Naples), September; (5) seaplanes tour of Italy; (6) an international contest for small touring machines; (7) spherical balloon contest.

ROYAL AERONAUTICAL SOCIETY NOTICES



Lectures.—The next meeting will be held on February 17, when Mr. Handley Page, Fellow, will read a paper on "The Handley Page Wing."

New Member of Council.—At the January Council Meeting a letter of resignation from Colonel Alan Burgoyne, M.P., was read. It was decided to accept Colonel Burgoyne's decision with regret, and Colonel The Master

of Sempill, A.F.C., was co-opted to serve in his stead until the next elections.

Revision of Rules.—Consideration of the draft revision of the rules of the Society prepared by the Secretary was commenced by the Council at the January Meeting, and will be completed at the next meeting on February 15. These will then be brought before the Annual General Meeting at the end of March.

Membership Card.—The Council have approved the design and distribution of a card of Membership to be sent to each member of the Society whether technical or non-technical. These cards will be renewed annually, and will serve as admission tickets to all special meetings, such as the recent visit to the National Physical Laboratory, in future.

Visit to National Physical Laboratory.—About 50 Members availed themselves of the opportunity kindly afforded by the Director of the National Physical Laboratory, to visit the

Aerodynamic Department of the Laboratory on January 26, The experiments being carried out in each of the five wind-tunnels were described, and the party were also shown the new 14-ft. "Duplex" tunnel which has just been completed, in addition to seeing visual experiments in a small water-channel. They were then entertained to tea by the Laboratory Staff in the large wind-tunnel chamber.

Election of Members.—The following Members were elected in the various grades as shown at the Council Meeting held on January 25:—*Associate Fellows*: Capt. E. E. Aldrin, U.S. Air Service, Wing-Commander F. F. Briggs, D.S.O., O.B.E., Flight-Lieut. F. L. C. Butcher, S. Payne, Esq., M.I.N.A., W. P. Rogers, Esq., A. J. Spencer, Esq., A.M.I. Mech.E., E. P. Warner, Esq., R. P. Wilson, Esq., C.B.E., M.Inst. C.E., M.I.E.E. *Students*: Capt. W. C. Cooper, H. A. Dalton, Esq., J. G. Edenborough, Esq., F. A. Kerry, Esq., G. E. Page, Esq., A. P. Rowe, Esq., Flying Officer A. V. Shewell. *Members*: H. A. Crook, Esq., J. J. Holt, Esq., H.H. The Maharaj Rana of Jhalawar, Squadron Leader H. R. Nicholl, O.B.E. *Associate Members*: L. K. Forbes, Flying Officer F. L. Hopps, A.F.C. *Foreign Members*: J. McAllister Allan, Esq., Lieut. R. Arisaka, I.J.N., L. Mapelli de Pietro, Esq., Lieut.-Engineer H. N. Pantolini, Argentine Navy, Lieut.-Commander Louis Sable, French Air Attaché.

W. LOCKWOOD MARSH,
Secretary

BY SEA, AIR AND LAND—THE TRANSPORT TRINITY

AT the annual dinner of the Marine Engineers' Institute last week at the Hotel Cecil, when Lord Weir presided, Air-Marshal Sir. F. H. Sykes, when replying for the Air Forces of the Empire, put forward a strong plea that the Institute should treat as a whole the development of sea, air and land transport. Amongst other very sound views he also further emphasised the necessity for military aviation to look for its strength from the commercial side and the reserve which thereby could be built up.

Sir Frederick Sykes said it was largely due to Lord Weir's untiring energy that we owed the success which attended our air effort during the latter period of the War. For many years he hoped that they would be able to look to him for advice. The submarine in the War had done marvels; aircraft had done well, and were going to do better. During the War he had seen something of the mercantile marine, and he took his hat off to it. The marine engineers and those interested in the air were partners in the construction of the aircraft carriers. It was his assumption that a fleet was no good without its aircraft, and to have aircraft a long way from land they must have carriers. Another problem which marine engineers had to face was that in future they would have to armour ships against aircraft. If they did not they were going to have a bad time from the air. The future of aviation had an important bearing on a problem which was receiving wide publicity—the advantages and disadvantages of the capital ship. Suggestions had been put forward for substituting air power for sea power. It was not a question of rivalry, but of co-operation, though in the future aviation might find itself in a position to relieve the Navy of much of its responsibility. The question of securing protection from aircraft might be by increased speed or, in the more distant future, submersible battleships. Co-operation between naval and aircraft constructors would, however, tend to increase, and it was upon their joint consideration of naval and air problems that we must rely for the development of a really efficient fighting force.

There was a close analogy and a further bond of sympathy between the Navy and the Air Force, in that the task of ensuring an adequate reserve for each was on much the same basis. They could not afford, in the present state of their finances, to maintain either a large Navy or a large Air Force in times of peace. Naval supremacy arose from and depended on our commercial supremacy, and for many years the Navy had looked to the mercantile marine for its reserve of men and material. It was the splendid spirit shown by the men of the mercantile marine which enabled them not only to maintain, but to increase the Navy during the War. "If," continued Sir Frederick, "we can only build up an air merchant service and develop such a spirit of devotion in our pilots, I think we need have little to fear in the air in time of national emergency. I have the honour to preside over the department which is responsible for civil aviation, and one of our convictions is that, without commercial supremacy in the

air, design staffs, and the reserve of pilots, engineers, material, and operational and constructional experience gained therefrom, our air forces will never be supreme. For this reason I regard the promotion of civil aviation as essential, not only to commercial enterprise, but to security. During the summer months our transport firms managed to maintain a number of air services to the Continent, but these must be regarded to a certain extent as experimental, since the distances are so short that the full advantage of the aircraft's speed cannot be obtained, and it is difficult to enter into competition with the existing means of transport. It is possible that before long experiment will prove that the airship is capable of performing the journey to Egypt regularly in one stage.

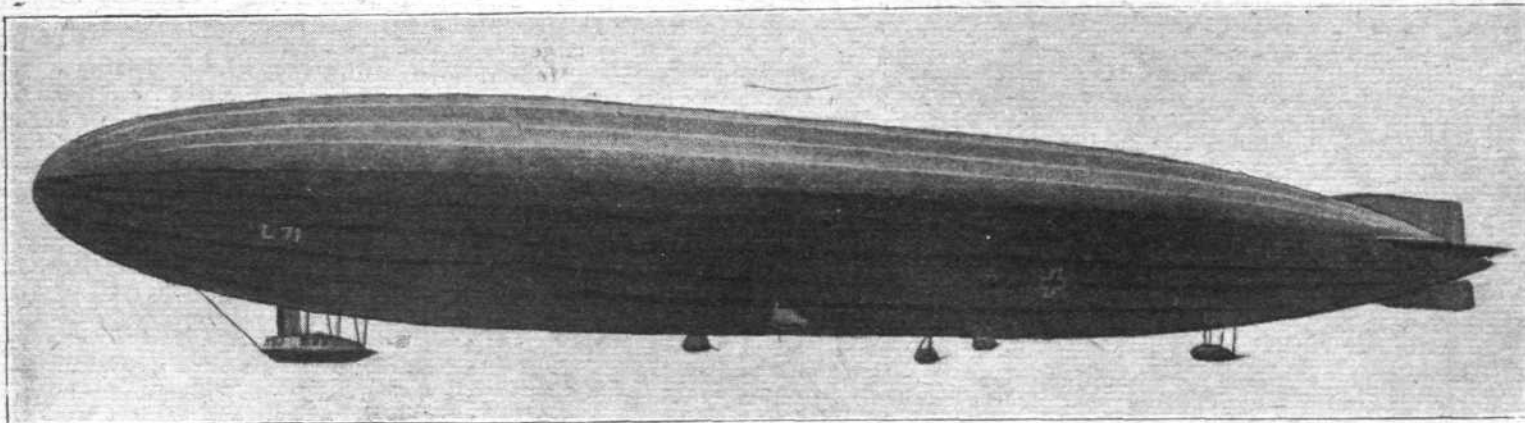
"I think, too, that it is highly desirable that each Dominion and Colony should develop its own civil aviation, and so, linking up with each other as opportunities are offered, and co-operating by exchange of information and a common policy, evolve a co-ordinated Imperial air system. Countries like Canada, Africa, India, and Australia possess the wide areas required. I am glad to see here tonight representatives of Australia and New Zealand. They are already considering how to develop aviation. In Australia there are wide expanses of undeveloped and sparsely populated country which do not warrant the laying down of railway lines, and which can probably be more economically penetrated by air lines. Some interesting schemes have already been thought out for connecting Northern Australia by air with the South, for mail services between Melbourne, Sydney and Tasmania, and, in New Zealand, for mail services between the two islands. I hope these schemes will bear fruit, not only because I am convinced that one day air transport will be the principal mail carrier and a recognised method of travel, but because it is essential for strategical purposes to establish air bases throughout the Empire. Shipping interests can render great assistance by utilising aircraft as complementary or feeders to the main ocean routes. There are many instances of companies having to operate subsidiary routes which are not economically productive. A prominent example is the West Indies.

"It is probably not difficult to maintain an adequate service to Trinidad or Kingston, but the economic carriage of passengers, and more particularly the distribution of mails, beyond these points to the innumerable islands of the Antilles is a much more difficult problem, and the present lack of inter-communication between the islands is a serious drawback to the development of some of our potentially richest colonies. I would, therefore, very seriously commend to the consideration of shipping companies the value of utilising aircraft in connection with their ordinary services. The same thing applies, of course, to railway communication, especially in countries such as Africa, where railway lines are as yet only laid in sections, and in Canada, where the air can supply lateral services."

"L.64" AND "L.71" Two of the Zeppelins Surrendered to Great Britain

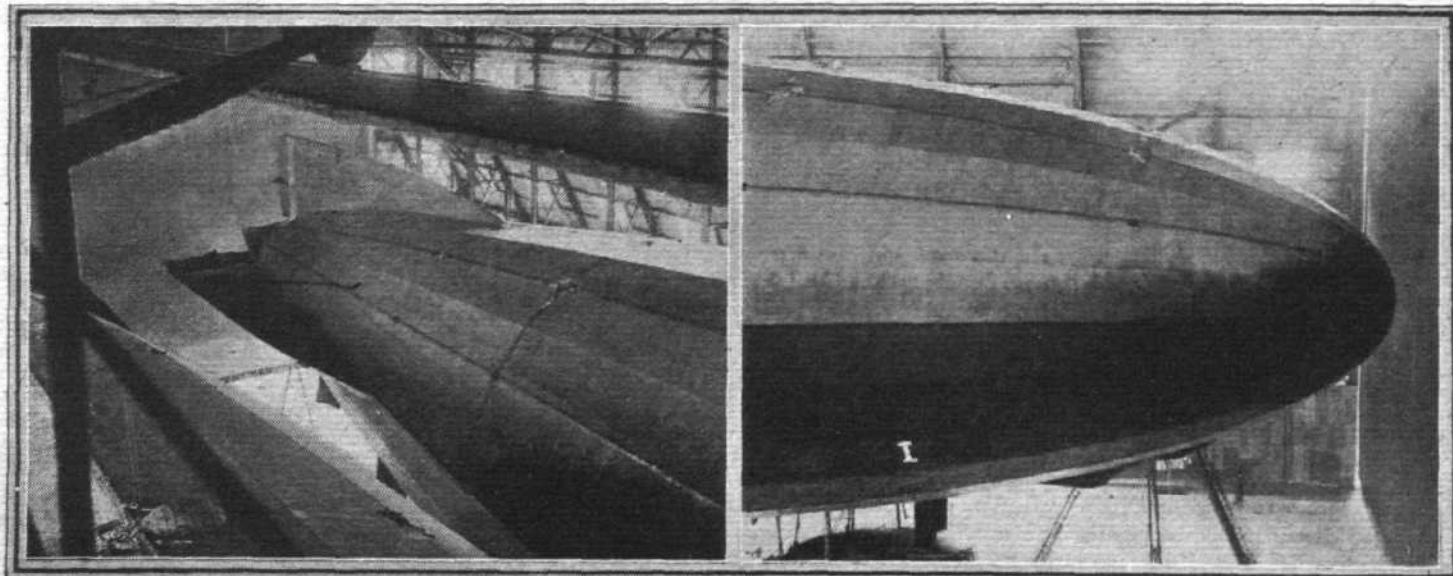
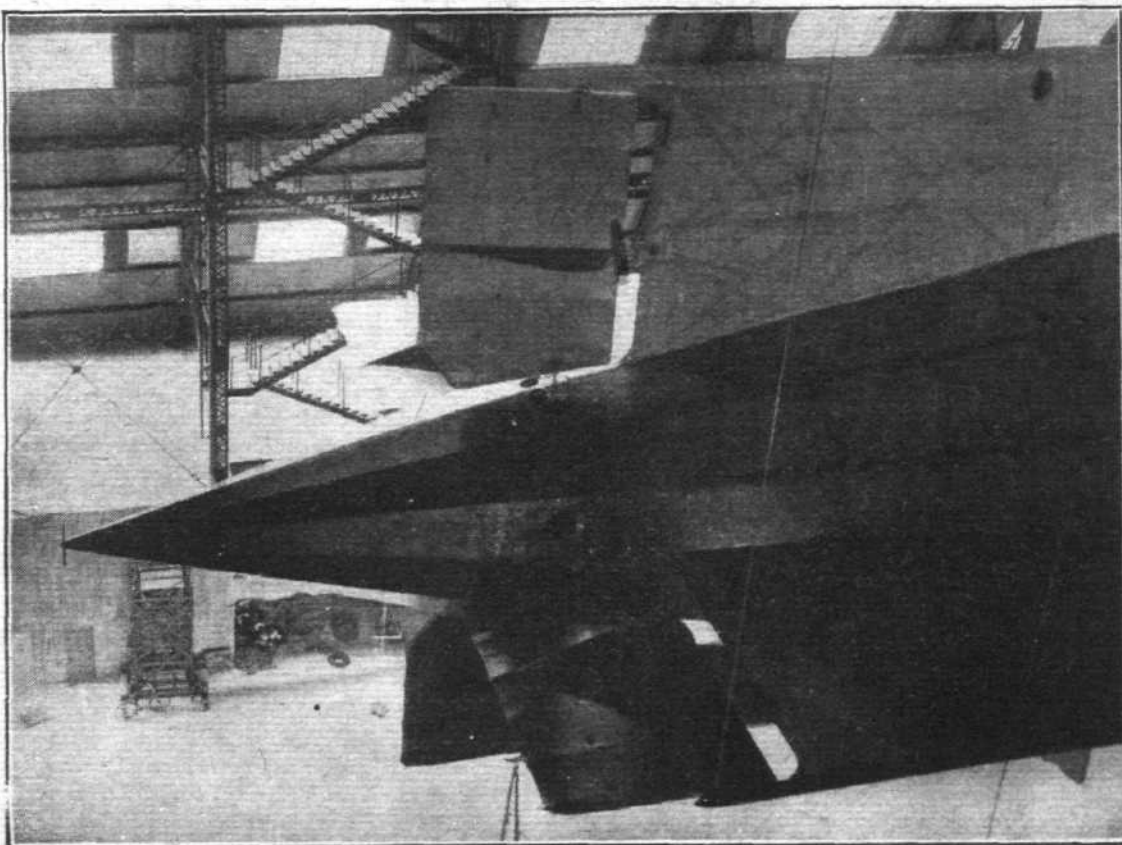
(Concluded from page 58)

"L.71" ("L.Z.113") was the second ship of the last series of Zeppelins completed by the Germans before the Armistice, and is therefore, like the "L.72" surrendered to France, the latest type of war Zeppelin. In its original

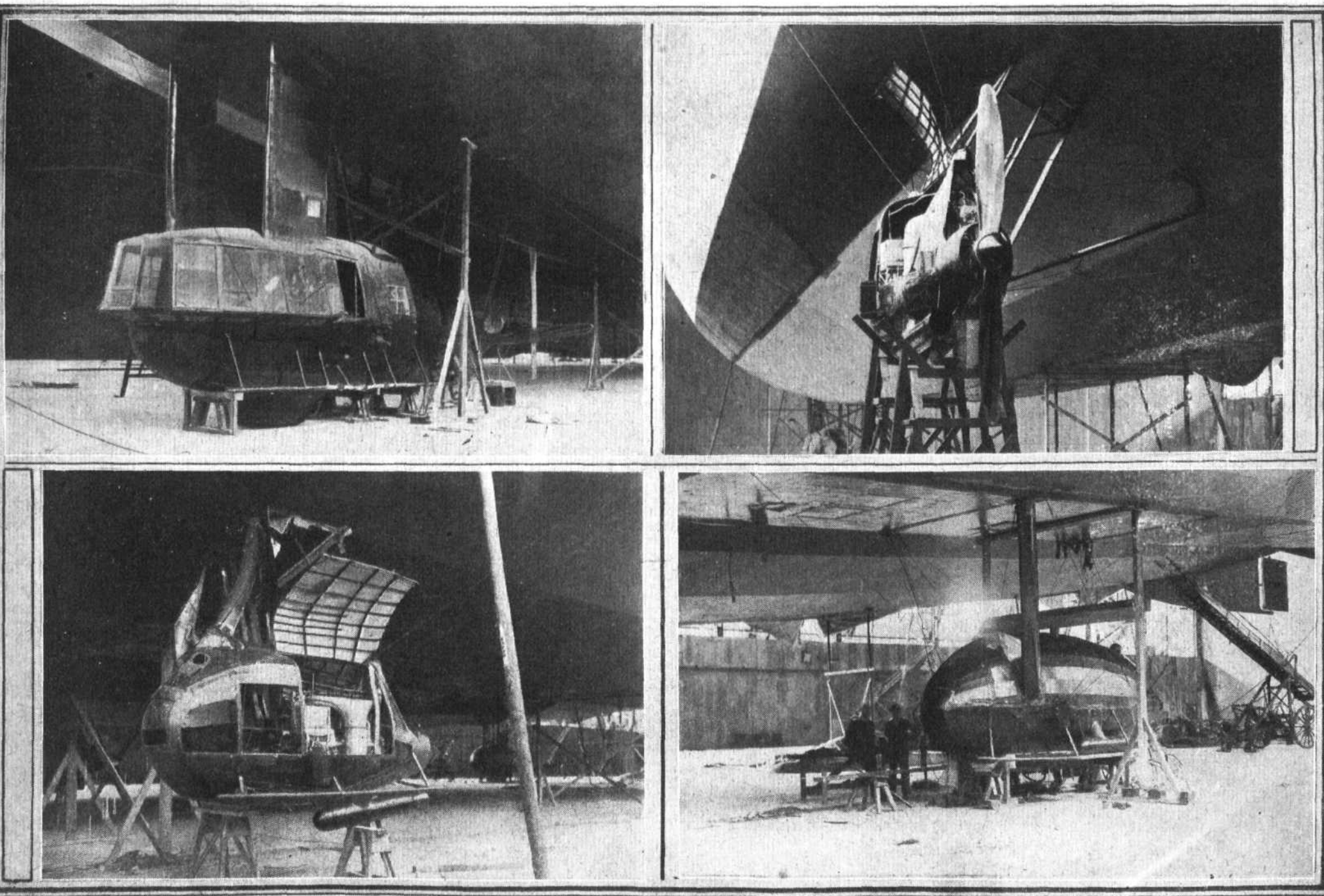


THE SURRENDERED ZEPPELINS: "L.71" in flight

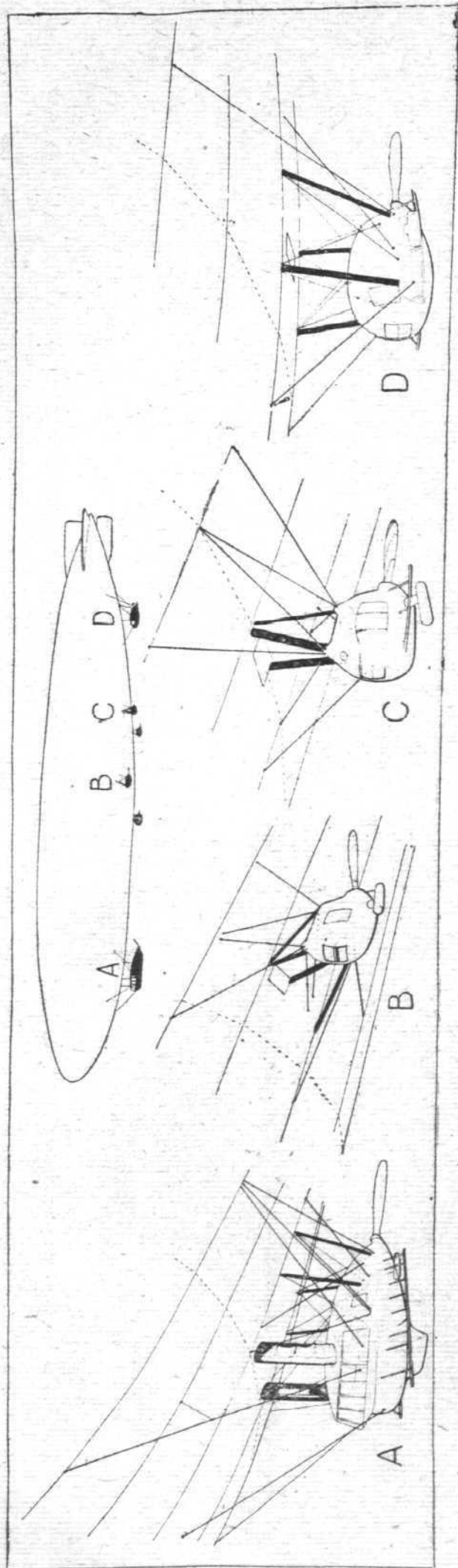
The Surrendered Zeppelins: A close-up view of the rudders and elevators of "L.71"



THE SURRENDERED ZEPPELINS: The tail and nose of "L.71"



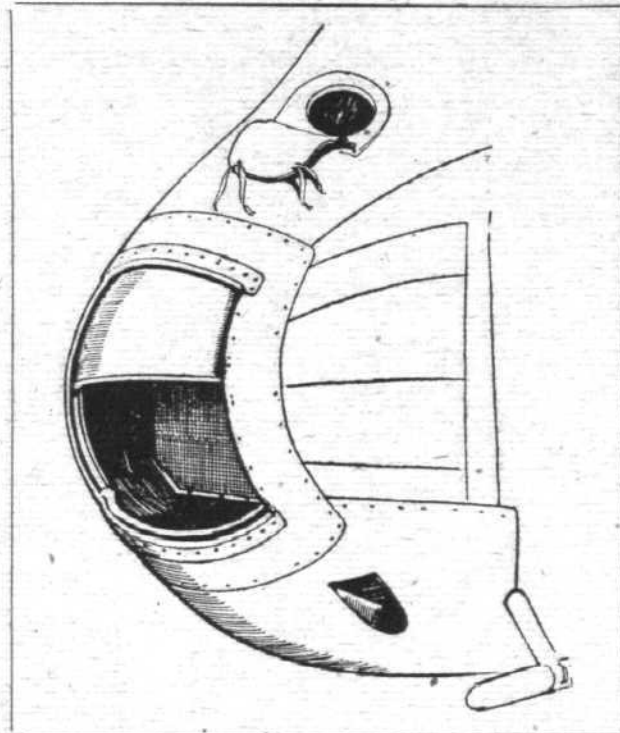
THE SURRENDERED ZEPPELINS: The car arrangement of "L.71." At the top (left) is shown the forward and main control car, and on the right the port unit of the first pair of power "eggs." Below (left) is the port unit of the second pair of power "eggs," and on right the rear car unit.



This diagram indicates the suspension, by cables and streamlined struts (wood), of the six cars on the "L. 71." The first pair of side-cars (B) are located higher up and further out than the second pair (C).

form it was similar to "L. 70"—the first ship of this class—which was destroyed by our naval forces on August 5, 1918. The "L. 70" and "L. 71" as first turned out were 693 ft. long, 78 ft. in diameter, and had a capacity of 2,200,000 cu. ft. distributed over 15 gas ballonets. The gross displacement was about 65 tons, and the gross disposal lift 44 tons. In the "L. 70" class the arrangement of cars was different from previous types, in that an extra pair of side-cars was added, making six in all, the rear car having two engines.

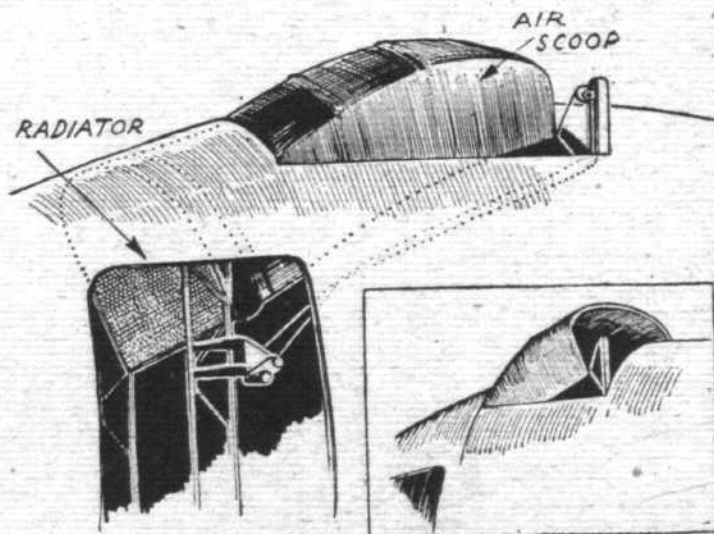
Later, the "L. 71" was rebuilt and several modifications introduced. The length of the hull was increased to 743 ft.



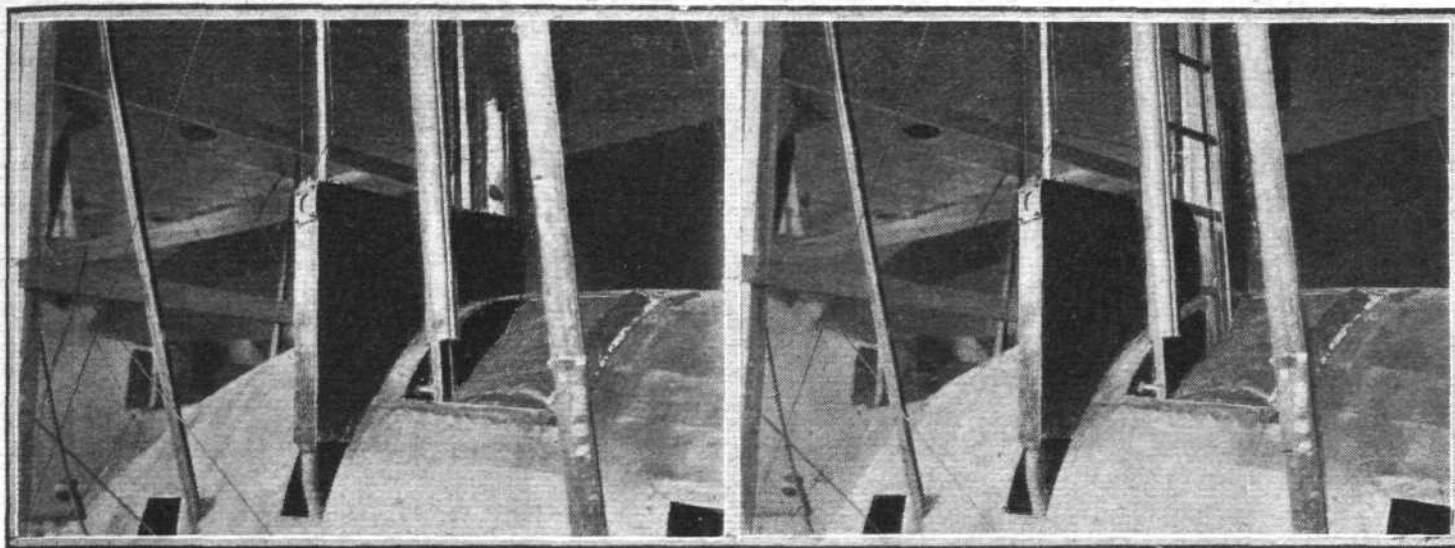
The enclosed radiator as fitted to the rear and side cars of the "L. 71": In the nose of the car are two sliding shutters, operated from within, which regulate the volume of air passing through the radiator. The opening shown in the bottom of the car is an air inlet, regulated by a throttle, passing fresh air to the interior, the air emerging near the engine.

by the addition of another gas compartment, which brought up the capacity to 2,500,000 cu. ft. The gross displacement was increased to about 75 tons and the gross disposal lift to 50 tons. In its present form the rear car is much smaller, and contains only one engine instead of two. The maximum speed of "L. 71" is about 75 m.p.h.

As far as we could see from our examination of "L. 71"—which was unavoidably little more than a cursory one—the general construction differed very little from that of "L. 64,"

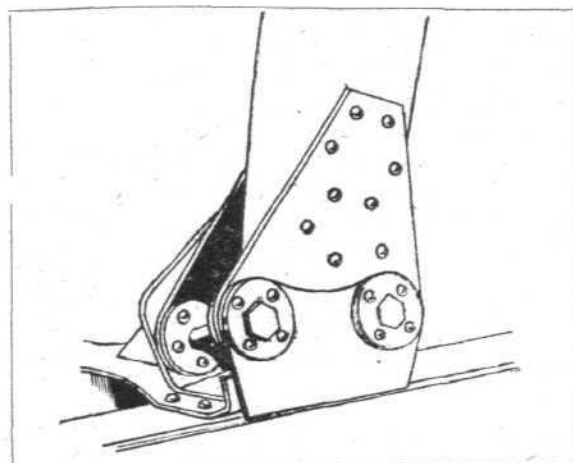


The enclosed radiator of the front car of "L. 71," showing how the volume of air passing through the former is regulated by means of an air scoop hinging in the roof of the car.

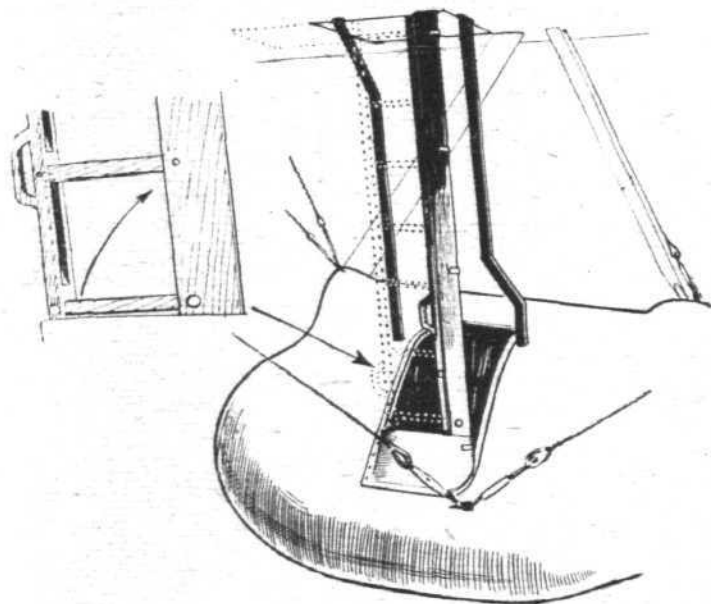


THE SURRENDERED ZEPPELINS: Two views showing the folding ladder-strut, giving access to the hull from the rear car on "L.64." The ladder is shown on the left closed, and on the right open. The sliding radiators may also be seen.

previously described. We saw, however, a distinct difference in the construction of the vertical and horizontal stabilising surfaces. These are built up integral with the hull framework, the sides of the hull merging with the fins, and the hollow spaces within the latter being in direct communication with the interior of the hull. The top fin thus forms a trap for any



The attachment of the streamline suspension strut to the longitudinal member of the side-car on "L.71."



The folding ladder-strut giving access to the interior of the hull on one of the side-cars of "L.71."

free gas, an outlet for the latter being provided at the top of the fin.

The rudders and elevators, like those of "L.64," are very similar to the "L.33" type. In addition to the usual vertical ventilating shafts—one between every pair of ballonets—a shaft also runs from the forward end of the keel to the port side of the nose. The catwalk, together with the water ballast bags, petrol tanks, etc., does not differ materially

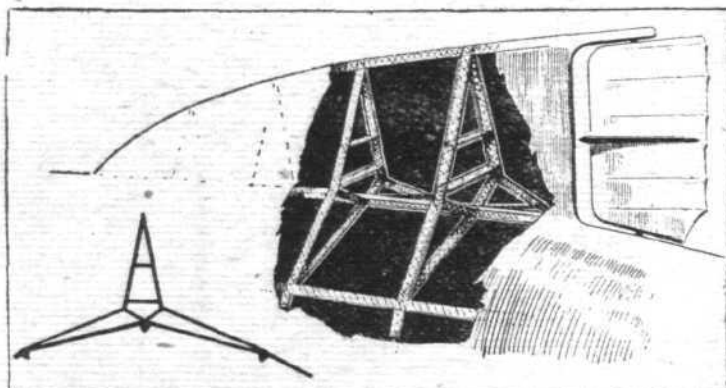
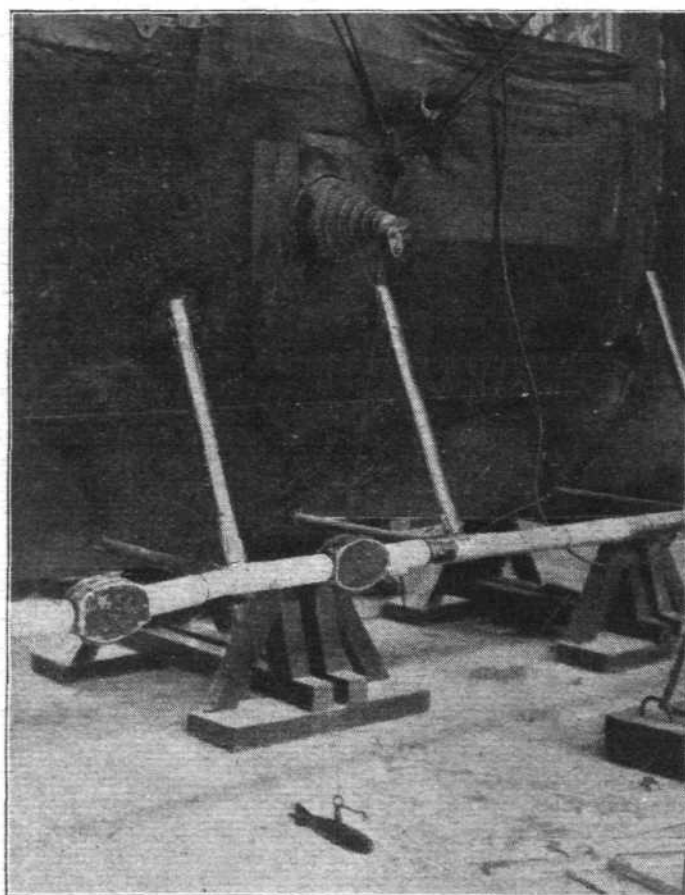
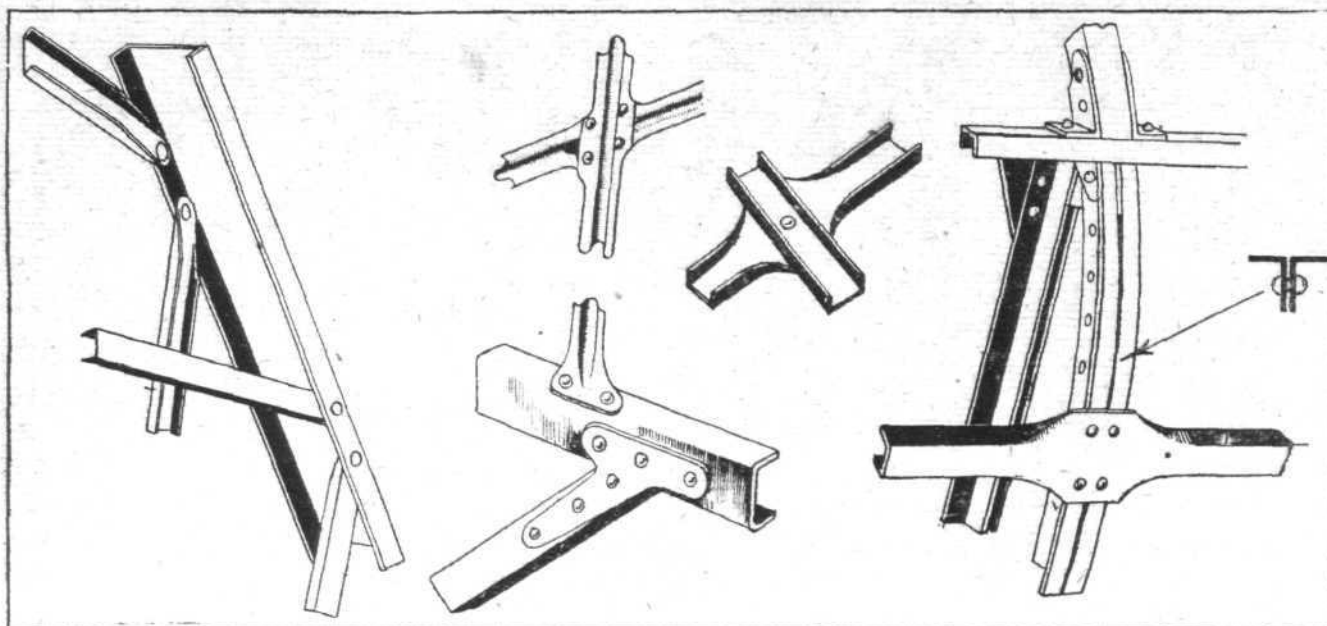


Diagram showing the new form of tail-plane construction employed on "L.71." The fins now form an integral part of the hull framework, as shown.



THE SURRENDERED ZEPPELINS: How the wireless telegraph aerial is carried on the forward car of "L.71." Note the streamline weight.



Some examples of the various forms of girder construction employed throughout "L. 64" and "L. 71": On the extreme right is shown that mainly employed in the rear and side cars of "L. 71."

from that of "L. 64," shown in one of the accompanying illustrations. The petrol tanks, in the catwalk, are arranged in groups of four or six in the locality of their respective engine cars, and some of each group are provided with a slip-gear by means of which a portion of the total petrol carried may be dropped overboard in case of emergency.

The forward car is practically the same as that—which is located below the second and third gas compartments—on "L. 64," and differs only in minor details. There is, for instance, a small gangway communicating with the engine compartment, whilst a neat and, we should think, very efficient arrangement of mounting the radiator is employed. The radiator is supported on two lattice girders inside and at the forward end of the engine compartment. The forward face of the radiator is enclosed by a "bag" leading to a hinged scoop or hood mounted in the roof of the car. The mouth of this scoop, which faces forward, may be raised or lowered, thus allowing more or less air to pass in, and thence through the radiator. The engine in this car is a 260 h.p. 6-cylindrical Maybach (the same make and power is employed in the other five cars), and it is fitted with a reverse as well as a clutch. The overall length of the front car is about 40 ft.

The wing or side cars are very much smaller than those on the "L. 64," and are well streamlined. The first two are

located below the sixth and seventh gas compartments from the nose, and are mounted fairly high up and far out. The main framework, mostly of channel-section members, is in the lower half, the upper half consisting of a pair of inverted V struts, to which the suspension cables are attached, and a light fabric-covered framework with side windows. The petrol pipes from the tanks and the engine telegraph cables are led through the streamline struts. The second pair of cars are very similar to the first, but these are located—below the ninth and tenth gas compartments—a little lower down and closer together. In all four side cars, as well as the rear car, the radiator is mounted within the car in the nose. Two sliding shutters in the latter, and operated from within, regulate the volume of air passing through the radiator.

The rear car is comparatively small, though larger than the side cars, and is provided with a second set of controls, the second-in-command being located in this car. It is located below the eleventh and twelfth gas compartments, and is built up mainly of T-section—or strictly speaking two L's placed back to back—transverse hoops with channel-section longitudinals, the whole framework being covered with fabric and sheet aluminium. The engine is fitted with a clutch only, and no reverse. Both front and rear cars are fitted with bumping and floatation bags. All six cars have the folding ladder arrangement previously described.

HOWARD LECTURES—ROYAL SOCIETY OF ARTS

THE Howard Lectures, 167th Session, 1920-21, were given by Mr. Alan E. L. Chorlton, C.B.E., of Messrs. Beardmore and Co., Ltd. The subject chosen by Mr. Chorlton was "Aero Engines," and the first paper was read on January 17. Mr. Chorlton then dealt with the early attempts to produce motive power for flight, and mentioned the external and internal combustion methods. He also dealt with possible fuels, materials of construction, steam reciprocating and turbine engines, and internal-combustion engines and the development of the latter as regards thermal efficiency, power and weight. Reference was made to the first successful engines in flight, and an outline was given of aero engines existing in 1910 and the developments which took place before 1914. The lecturer also pointed out the relative importance of weight and fuel economy.

The second lecture took place on January 24, when the subjects treated by Mr. Chorlton may be summarised as follows:—British and German aero engines at the beginning of the War—development of the six main types during the War—comparison of British and German practice—special experimental types—limiting conditions in different types—supercharging—and examples of different types.

The third lecture was given on Monday last, January 31, when Mr. Chorlton dealt with engines in use after the War and with future possibilities of development. With the object of presenting the possibilities of development of the engine in a ready manner, a comparative table of all types was

shown and each type analysed separately and compared, in its fundamental details, with the others. The radial type as one coming into favour was shown to have a limitation in increase of speed due to the crank-pin load, and the possibility of the increase of speed, and therefore reduction in weight, in the simple vertical type appeared to be much greater than had been supposed.

The general difference in weight between types does not come out to as much as had been thought, and therefore the considerations of simplicity and ease of examination as being of first-class importance can be more readily attained, as the restriction to type on account of weight is not so essential for the foregoing reasons. The engine was examined thermodynamically, mechanically and metallurgically. As a final result of the examination it seems possible to look forward in the future to engines of even less than 1 lb. weight per b.h.p. Special engines with the exceptionally high economy in airship work were also dealt with. On the practical side, tables of alternative engines for a standard service, like the Paris service, were given. Figures were also given of upkeep and overhauling for both military and commercial service. The supreme importance at a period like this, when economy is in every mouth, of not cutting down experimental work on the aero engine as the absolute heart of all mechanical flight, was emphasised, and it was suggested that what has already been done can, with advantage, be increased.



AIRISMS FROM THE FOUR WINDS.

"R.34" mishap is a misfortune at about as inopportune a moment as could well have been selected. It may give the final quietus to the immediate prospects of Governmental support for lighter-than-air craft. A plausible excuse was all that was wished for, and this may be found in the disaster. But what a different tale would be forthcoming were a cordon of mooring masts in being at airship centres! That will no doubt come in time, and we hope before similar endings are risked to the magnificent aircraft already in commission and the latest vessels now nearing completion.

THAT we are not alone in pinning our faith to mooring masts is evident from a paragraph in one of the daily picture sheets when recording the mishap to "R.34." Thus our contemporary:—

"General Maitland said this morning that if the crew had been provided with mooring masts the ship, which it was found impossible to house, would have ridden out the gale."

Carelessness indeed. These things should be carried quite as much, as a matter of course, as a wrist-watch.

BRENTWOOD, Essex, has set the pace for pilot guidance! On the roof of the G.E.R. station the name now appears in letters 15 feet long. Why should not every suitable station in the country follow suit in due and reasonable time?

WHITEHALL STAIRS, on the Embankment, appears to be the site most likely to be selected for the erection of the R.A.F. memorial. This will be the public memento of the great sacrifices of the R.A.F. in the War, whilst the other aims of the Fund seek to provide schooling for airmen's children and assistance for disabled men or their dependants.

PARACHUTING is becoming quite the vogue in France. Angoulême is the centre for these little adventures, and the other day when M. Blanquier, a demonstrator, failed to be on time, his 65-year-old father, promptly and sportily offering himself as a substitute for the drop, was taken up by M. Desmoulins in his Sopwith, and made a perfect landing from a 300-metre jump. He deserved the ovation which awaited him from the assembled "audience."

THOSE awards for Inventions, announced last week in the first Report of the Special Commissioners and published in *FLIGHT*, are just a wee bit misleading. What we should like to see in most cases is a statement of account after E.P.D., income-tax and a few other miscellaneous annexations have been deducted. Oh, what a difference in the result!

A GOOD many months ago in these columns we recorded an example of "It's an ill wind," etc. The case was of one James Green, who, when serving in France, was sentenced to death for desertion, but the sentence was commuted to five years' penal servitude. As a result of a German air raid on a railway station, where Green was waiting with an escort, who were taking him to a detention station, the escort and other people were all killed, and Green alone escaped. One would have thought such a providential escape would have helped to have reformed the prisoner; but it would appear as if it had rather helped to settle him upon a deliberate life of crime, as following his various delinquencies, as noted at the time in *FLIGHT*, Green was again before the London Sessions Judge last week for housebreaking, and, following a sentence of three years, boldly announced



AT THE DINNER OF THE FAIREY AVIATION SOCIAL AND ATHLETIC CLUB: A very pleasant gathering last week held at the Park Hotel, Hanwell. Mr. Fairey, who occupied the chair, is on the extreme right seated against the wall, and Mrs. Fairey is on his right.



The human pilot and the Inventor of the new "automatic pilot" now being tried out by the Handley Page Company. Left M. G. Aveline, the Inventor, and right Major H. G. Brackley, D.S.O., who is testing the device on an H.P.

from the dock: "While I remain in this country I will never stop stealing for my living. There is no other way to get a living." Some people never seem to be satisfied.

THE other day, at a gathering of those interested in the British magneto industry, it was stated that quite a lot of Bosch magnetos were "exchanged" with Germany by this

country for tyres which the Huns wanted as badly as we wanted their sparkers. We are just wondering whether the belated case of espionage, which is reported from Berlin last week as having been heard by the Supreme Court at Leipzig, has any connection with this same little bit of bartering. From the details to hand it appears that in December, 1917, considerable uneasiness was caused by the continuous disappearance of parts of aeroplanes from the big aviation works at Adlerhof, near Berlin. In particular it was found that the stock of Bosch magnetos, which should have been 20,000, was 8,000 short of this figure. Frequent fires had also occurred in the works, and had evidently aimed at preventing the discovery of the thefts of material. It is said to have been discovered that the missing magnetos had been sold to Christiania, and thence found their way into the hands of the Entente Governments.

Investigation of the losses led to the arrest of two engineers, Kurt Steinauer and Franz Luepke, who were sentenced on January 25 to three years' penal servitude. From the newspaper reports the exact nature of the charge against them is not clear, but it is stated that they were indicted only for an attempt, and not for a completed offence.

DURING his recent official visit to Paris a pathetic appeal was made to Mr. Lloyd George by M. Clement Ader upon the subject of Britain building up, in conjunction with France, a formidable aerial arm capable of countering any air-force Germany could reasonably hope to put up as a surprise packet in the future. By way of inducement to take this same long view, M. Ader otherwise foretells Paris as being in ashes first, to be followed by a similar fate for London. The warning is a solemn one and seriously urged by this great French pioneer of aviation. And we are inclined to think this country might do many things worse than to co-operate in the manner suggested.

Apropos the finding of Zepp. bombs in unexpected places, to which we referred the other week, Mr. D. Plank, of Barnet, sends us details of the finding recently of another bomb in a hedge in his neighbourhood. It was discovered by a hedge-trimmer in a field near Potter's Bar Station, who first thought it was a paint tin, but, fortunately, taking a longer view, he decided it was an unexploded bomb, and duly saw that the authorities took it in charge. From the description it would appear to be of an incendiary nature, and has since found a resting-place with the military authorities.

HERBERT HARRISON, a Ramsgate schoolboy, it is announced, was first in the country, out of 372 successful candidates in the examination, for boy mechanics entering the Royal Air Force.

Foreign Decorations and R.A.F. Officers

THE King has given unrestricted permission for the wearing of the following decorations conferred by Allied Powers on officers of the Royal Air Force in recognition of valuable war services:—

Cross of Officer of the Royal Order of George I (Greece).—Major Pearce Blair.

Order of the Nahda, 4th Class (Hedjaz).—Squadron Leader Frederick William Stent, M.C.; Capt. Frank Harold Furness-Williams; Lieut. Kenneth John Oldfield, D.F.C.

A.F.C. Award Cancelled

THE *London Gazette* of January 25 contains the following announcement:—

"The King has directed that the award of the Air Force Cross to Major Edward Ernest Clarke, which was gazetted on June 3, 1919, shall be cancelled, and his name erased from the Register in consequence of his having been convicted by the Civil Power."

New President of Aero Club of America

MR. MYRON T. HERRICK, of Cleveland, O., former ambassador to France, has been elected President of the Aero Club of America. This change follows upon the recent amalgamation of the American Flying Club and the Aero Club of America. Colonel Jefferson DeMont Thompson, who has acted as president of the Aero Club of America during the reorganisation period, becomes chairman of the Board.

A New Mexican Air Chief Appointed

THE appointment is announced of Rafael A. O'Neill as Chief of the Mexican National Air Force, Rafael Ponce de Leon being appointed the Chief of Staff. Rafael O'Neill is stated to have recently come over to England for the purpose of obtaining machines for the formation of several squadrons, together with necessary apparatus for repairs for the equipment of the forces in the field and at the flying school. Which sounds as if somebody should have booked a good order this side.

Yet another French Helicopter

LAST week we announced that tests had taken place on a helicopter type of machine by means of a balloon lifting part of the weight. We now learn that the machine in question was designed by M. Etienne Oehmichen, and has been built by the famous motor firm of Peugeot at Valentigney. The Oehmichen-Peugeot helicopter consists of a framework carrying an old-fashioned Dutheil-Chalmers two-cylinder opposed engine, which drives two direct-lift screws via a belt transmission. The machine is of the simplest form possible, and no attempt has been made to incorporate means for balancing or for translational motion. In other words, it is just a large-size model on which the lifting power of the two screws can be tested.

As related last week, a balloon has on occasion been employed for taking part of the load and thus facilitate the gradual trial of the machine. During one test the following figures were obtained: Weight of machine with pilot, 740 lbs.; lift of balloon, 156 lbs.; weight lifted by screws 740 - 156 = 584 lbs. As the engine is said to develop 25 h.p. the load lifted is 23.4 lbs. h.p.

Spanish Air Routes for 1921

AMBITIOUS routes are promised in Spain for air traffic during the current year, viz., between Madrid and Paris via Soria and Logrono; Madrid and Barcelona; Madrid-Valladolid-Burgos-San Sebastian; Madrid-Albacete-Carthage; Madrid-Valdepenas-Cardoue-Seville-Tangiers; and Madrid and Lisbon via the valley of the Tagus.

German Air Lines

DURING the latter days of December the Deutscher Luft Lloyd started the Berlin-Magdeburg-Nuremberg-Munich air line. During the first week of this month the Hamburg-Magdeburg-Breslau line is to be started. These two routes cross at Magdeburg, and they will work in relation to one another.

THE ROYAL AIR FORCE

London Gazette, January 21

Flying Branch

Pilot Offr. (Hon. Flying Offr.) F. C. de L. Kirk (Lieut., Norfolk R.) relinquishes his temp. commn. on return to Army duty; Aug. 26, 1920. Flight Lieut. K. M. St. C. G. Leask, M.C., is placed on the half-pay list (Scale B); Jan. 20.

Transferred to Unemployed List:—Lieut. A. P. Stock; Jan. 2, 1919. Lieut. E. M. Wright; Feb. 28, 1919. Lieut. N. Cook; June 13, 1919 (substituted for *Gazette* July 15, 1919). Sec. Lieut. B. Solomon; Dec. 7, 1919. Lieut. W. Murphy; May 29, 1920 (substituted for *Gazette* June 15, 1920).

Administrative Branch.—*Gazette* of Sept. 9, 1919, relating to Lieut. E. C. Batchelor, M.C., is cancelled.

Technical Branch.—Transferred to unemployed list:—Sec. Lieut. E. W. Wrigley; Feb. 22, 1919. Lieut. (actg. Capt.) G. J. Dewhurst; March 13, 1919. *Gazette* of March 7, 1919, relating to Sec. Lieut. W. H. Johnson, is cancelled.

Medical Branch.—Capt. J. P. Hosford, M.B., is transferred to unemployed list; Jan. 13.

Memoranda

Hon. Sec. Lieut. R. E. Petch relinquishes his hon. commn. on appointment to T.F. Hon. Sec. Lieut. W. J. Hill relinquishes his hon. commn.

Seven Cadets are granted hon. commns. as Sec. Lieuts., with effect from date of their demobilisation.

London Gazette, January 25

Permanent Commission

Squadn. Leader D. R. MacLaren, D.S.O., M.C., D.F.C., resigns his permanent commn., and is permitted to retain rank of Maj.; Dec. 1, 1920 (substituted for *Gazette* Dec. 24, 1920).

Short Service Commission

Flight Lieut. J. C. O. Dickson, D.F.C., is transferred to Reserve, Cl. A.; Jan. 15.

Flying Branch

Sec. Lieut. R. L. Frace is ante-dated in his appt. as Sec. Lieut. (A.); May 7, 1918. Maj. (actg. Lieut.-Col.) A. S. W. Dore, D.S.O., relinquishes his temp. commn. on appt. to T.F. Reserve, and is granted rank of Lieut.-Col. Lieut. E. G. T. O'Kill relinquishes his temp. commn. on appt. to T.F. Reserve and is permitted to retain his rank. Squadn. Leader L. T. N. Gould, M.C., is placed on half-pay (Scale B); Jan. 9. Lieut. R. C. Winn (E. Surrey R.) relinquishes his temp. commn. on return to Army duty; June 29, 1918.

Transfd. to the Unemployed List:—Lieut. A. de M. Severne; Jan. 30, 1919. Sec. Lieut. W. J. H. Johnson; Feb. 1, 1919. Lieut. A. B. Cochrane; June 13, 1919. Sec. Lieut. W. A. Evans; Sept. 28, 1919.

Administrative Branch

Gazette Feb. 14, 1919, appointing Capt. W. T. Calthorpe to a temp. commn., is cancelled. *Gazette* Sept. 14, 1920, relating to Lieut. (Hon. Capt.) W. T. Calthorpe is cancelled.

Transfd. to the Unemployed List:—Lieut. C. F. Cunningham; June 22, 1919 (substituted for *Gazette* July 15, 1919). Lieut. H. Walthew; Oct. 11, 1919. Lieut. (Hon. Capt.) E. A. Malcolm; Feb. 29, 1920.

Technical Branch

Lieut. (actg. Maj.) G. L. Chater relinquishes his temp. commn. on appt. to T.F., and is granted rank of Maj. Lieut. (actg. Capt.) F. B. Nicol is transfd. to the unemployed list; April 12, 1919.

Air Vice-Marshal J. F. A. Higgins, C.B., D.S.O., A.F.C., is restored to the active list; Jan. 17.

Sec. Lieut. J. D. Hudon relinquishes his commn., and is permitted to retain his rank; May 11, 1919.

The King has directed that the award of the Air Force Cross to Maj. E. E. Clarke, gazetted June 3, 1919, shall be cancelled and his name erased from the Register in consequence of his having been convicted by the Civil Power.

Memoranda

One Overseas Cadet is granted a temp. commn. as Sec. Lieut.; Feb. 15, 1919.

Fifteen Cadets are granted hon. commns. as Sec. Lieuts., with effect from date of their demobilisation.

London Gazette, January 28

Permanent Commissions

The following Flight Cadets having successfully passed out from the R.A.F. (Cadet) College, Cranwell, are granted permanent commns. as Pilot Offrs., with effect from Dec. 21, 1920.—C. W. Weedon, N. H. D'Aeth, J. E. L. Drabble, C. G. Hancock, H. W. Foote, J. G. Peck, W. C. Yale, G. R. C. Spencer, D. C. Prance, H. L. Beatty, C. J. Collingwood, H. G. Brookman, B. W. T. Hare, E. H. M. David.

Flight Lieut. R. B. Mansell, O.B.E., is restored to the active list; Jan. 24. Observer Offr. J. E. Kendrick, D.F.C., resigns his permanent commn., and is permitted to retain the rank of Lieut.; Jan. 8.

Short Service Commissions

The following are granted short service commns. with effect from the dates indicated, in the ranks stated, retaining their present seny. in the substantive rank last held prior to the grant of this commn., except where otherwise stated:—

Flight Lieut.—C. N. Lowe, M.C., D.F.C.; Jan. 12 (for three years on the active list).

Flying Offr. (from Flight Lieut.)—E. S. Moulton-Barrett; Jan. 17.

Flying Offrs.—R. E. Bright; Jan. 10. J. H. T. Carr; Nov. 22, 1920 (for three years on the active list). W. N. Cumming; Jan. 21. N. H. Jay; Jan. 18. M. K. McGregor; Jan. 18. S. T. Tipper; Jan. 17. E. J. Webster, D.F.C.; Jan. 11. S. H. Wallace, M.C.; Jan. 21.

Flying Offrs. (from Pilot Offrs.), seny. of the dates indicated.—P. F. A. Curtis; Jan. 10. (for three years on the active list). R. V. D. White; Jan. 18.

Pilot Offrs. on Probation, with effect from, and with seny. of, Jan. 15.—J. S. L. Adams, G. J. T. Bahin, G. S. Brown, M. H. Ely, D. H. Geeson, G. Hopkins, J. de la P. B. Preston, R. L. Ragg, G. H. Smith, B. A. C. South.

Flying Offr. Moulton-Barrett will be placed at the head of the list of Flying and Observer Offrs., and will retain seny. relative to officers who have been similarly gazetted to short service commns. in a rank lower than their previous substantive rank, in accordance with his previous position on the gradation list.

The name of Flying Offr. George Veevers-Carter is as now described and not as *Gazette*, Oct. 26, 1920.

Stores Branch.—Flying Offr. F. J. Cooke is granted a short service commn., retaining his present substantive rank and seny.; June 17, 1920 (for three years on the active list).

Medical Branch.—*Gazette*, July 13, 1920, appointing the follg. Flight Lieuts. to short service commns. is cancelled.—J. P. Horsford, M.B., J. J. O'Mullane, M. B. (substituted for *Gazette*, Jan. 21).

Flying Branch

Sec. Lieut. (Hon. Lieut.) P. G. Hutton relinquishes his temp. commn. on appt. to T.F. Reserve, and is granted the rank of Lieut. Sec. Lieut. (Hon. Lieut.) R. L. G. Wright relinquishes his temp. commn. on appt. to an Army commn.

Transfd. to the Unemployed List.—Lieut. C. D. MacDonald; April 1, 1919 (substituted for *Gazette*, April 25, 1919). Sec. Lieut. G. R. Young; April 14, 1919. Lieut. F. J. S. Clayden; Aug. 4, 1919 (substituted for *Gazette*, Oct. 24, 1919). Lieut. R. H. Tooley; Sept. 24, 1919. Sec. Lieut. J. Burton; Dec. 3, 1919 (substituted for *Gazette*, March 2, 1920).

Administrative Branch

The follg. relinquish their temp. commns. on appt. to T.F., and are permitted to retain their ranks.—Lieut. F. Morton-Smith, Lieut. H. G. L. Fletcher.

Lieut. A. J. Litton, D.S.M., relinquishes his temp. commn. on ceasing to be empd., and is permitted to retain his rank; Nov. 4, 1920 (substituted for *Gazette*, Nov. 12, 1920).

Transfd. to the Unemployed List.—Capt. A. Scarisbrick; Sept. 25, 1919. Lieut. (actg. Capt.) F. T. L. Avis; Jan. 10.

Technical Branch

Lieut. J. J. Chidgey is placed on the ret'd. list; Jan. 29. Flying Offr. F. J. Cooke ceases to be graded for pay and allowances, as a Flight Lieut., Grade B; March 31, 1920.

Seven Cadets are granted hon. commns. as Sec. Lieuts., with effect from the date of their demobilisation.

Lieut. V. Stranders is transfd. from S.O. to the unempld. list; Jan. 21.

**Air Raid Specials Honoured**

On Monday last the Prince of Wales at Olympia presented decorations and medals of the Order of the British Empire to officers and men of the Metropolitan Special Constabulary.

There were O.B.E.'s and M.B.E.'s conferred by the King for exceptional zeal and devotion to duty during the War, and forty-six medals of the Order for conspicuous gallantry during air raids.

One thousand two hundred Special Constables were drawn up in three sides of a hollow square. In the centre stood Colonel Sir Edward Ward, in command of the parade, and Colonel W. T. Reay, the second-in-command. Many of the men wore War decorations won overseas, there being two V.C.'s.

In a speech to the "Specials" the Prince said they took the places of those who were young and fit enough to go overseas, and kept watch and ward in London, and surrounding districts. During the air raids they more than did their duty on the home front. Their great voluntary work would never be forgotten. He congratulated all the 60,000 who had passed through the ranks of the force on what they did. He trusted the reserve now being formed would be kept up to strength, and was very glad to know that many of

the 10,000 men who had joined were men who had served overseas.

The Prince then presented the decorations. Afterwards he inspected a detachment of the 1st St. Pancras Boy Scouts, under Assistant Scout Master W. H. Stevens, who sounded the "All Clear" at every air raid during the War; and took tea with the Special Constabulary in the Pillar Hall.

The Next Pulitzer Trophy Contest

ANNOUNCEMENT is made by the Aero Club of America that the next competition for the Pulitzer Trophy will be held at Detroit on September 5, 1921. The Aviation Country Club of Detroit has been appointed to take charge of this aerial race this year. In addition to the Pulitzer Trophy itself, the Detroit club offers a purse of 10,000 dollars in gold, amongst the contesting flyers. The start will be at the U.S. Army Air Service plant at Selfridge Field, just outside Detroit, and will be over a triangular course of 45 miles, the first leg being at the Aviation Club of Detroit, and the second to the Packard Flying Field, with Selfridge Field as the third turning-point. Last year's race was won by Capt. C. C. Moseley, flying the U.S. Army 600 h.p. Verville-Packard, when 44 machines were entered to compete. This year it is hoped that nearer 100 entrants will materialise.

THE B.H.P. AERO ENGINE

THE Royal Commission on Awards to Inventors, under the chairmanship of Mr. Justice Sargant, on January 31 considered the claims of Lord-Invernairn (formerly Sir William Beardmore) and others in respect of the B.H.P. aero engine.

Outlining the case for the claimants, Mr. Hogg explained that in 1915 there was an urgent necessity in the field for an aero engine of higher power, the Germans having gone ahead in this respect. In 1916 Major Halford visited the Beardmore works, and as the result of conferences and conversations between Sir William Beardmore, Major Halford, and Mr. Pullinger, an engine was designed. The capital was supplied for the manufacture of the engines by Sir William Beardmore and Mr. Pullinger. Mr. Hogg said his clients were now confronted for the first time by the defence of the Crown that they were not entitled to anything because it was designed by Major Halford. In regard to their submission that alterations were made to the engine, it was perfectly true that modifications were made, but such modifications were only made to facilitate rapidity of manufacture. "It would have been impossible," said Mr. Hogg, "to have manufactured the other engines without the original design of the B.H.P." Mr. Hogg explained that the claimants' losses on their capital account through these engines was before another commission, and intimated that the Beardmore Company, in connection with the development of these B.H.P. aero engines, incurred an expenditure of £123,000, of which amount £47,000 represented their loss. He read a letter in which this amount was communicated to the Government, and added that, although there was a vast number of letters remaining he did not propose reading them. "As a method of procedure in Government offices they are interesting," he went on, "but so far as this claim is concerned I might just as well read to you, shall I say, the Book of Job." Mr. Hogg then, amid much amusement, read a letter which showed how Mr. Pullinger was referred to six Government officials, one of whom replied to Mr. Pullinger's enquiries that he "did not know anything about the animal."

Lord Invernairn bore out Mr. Hogg's statements, and said that other manufacturers were allowed to make the engine on the assurance of the Government that his claim would not be prejudiced.

Major Halford said that he discussed the question of a higher power engine with Mr. Pullinger on January 22, and before the day ended they had something on paper. Together they discussed the engine as points arose until they secured what they were out for.

The Commission then adjourned.

SIDE-WINDS

INITIATIVE is being shown by the Shell-Mex Company placing signs at the foot and on the summit of famous hills throughout the country. The signs are both neat and useful, the one at the foot of the hill indicating to the motorist the ascent and the one at the summit mentioning the altitude above sea level. The former indicates that a steep gradient



is before the motorist, and he therefore drives accordingly, while the latter gives him a useful idea of the hill-climbing capabilities of his engine. This scheme, initiated by the proprietors of "Shell" motor spirit, is one which should add considerably to the interest of motoring.

In some interesting aviation notes in *The Australian Motorist* the other week we found reference to the 25,000 miles flying on an Avro plane. Therein it is recorded, that without experiencing any engine trouble, Lieut. Roberts has recently completed his 25,000 miles' flying in Queensland on an

Avro machine, "Clerget" 130 h.p. engine, lubricated with that famous British oil, Castrol. During these flights he carried 1,500 passengers.

In New South Wales, amongst other aerial activities, the Avro people have been busy on a commercial aviation stunt. Captain Nigel Love has been piloting the representative of Berger's paints in a 5,000-mile flight throughout the leading towns of the State, with fine business results. He also lubricates with "Castrol"; in fact, it is the oil used exclusively by the Australian Aircraft and Engineering Co.

THE Second Annual Dinner of the Fairey Aviation Co., Ltd., Social and Athletic Club, together with the presentation of prizes by Mrs. C. R. Fairey, was held on Friday last at Park Hotel, Hanwell, Mr. C. R. Fairey, the president of the Club, occupying the chair. A strong contingent of the works assembled, and from the averages obtained throughout the playing season it was apparent that the employees play equally as well and thoroughly as they work at Aircraft construction. It was gratifying to hear from Mr. Fairey that the Fairey Seaplane has been adopted by the Admiralty and that the Works are well supplied with orders; one machine had just recently been delivered to "Grain" making a perfect flight from Hamble. May this state of affairs long continue. Several good musical items put everyone present in happy vein.

LEGAL INTELLIGENCE

Re C. J. H. Mackenzie Kennedy

At a meeting of the creditors of Mr. Chessborough James Henry Mackenzie Kennedy, aeronautical engineer, held on January 27 at Bankruptcy Buildings, a statement of affairs was submitted showing liabilities £42,324 and assets valued at £184,782.

The debtor had stated that he was formally a leading engineer in Russia, but on the outbreak of war returned to this country and experimented in the construction of large bombing aeroplanes. For his services he received an award of £31,000 from the Treasury.

He continued his experimental work, and had recently been engaged in the formation of an air transport scheme which had the approval of the Air Ministry.

His present position, he said, was one of temporary embarrassment only, and his assets would pay all his creditors in full and leave a substantial surplus.

They included a claim of £171,000 against the Air Ministry in respect of an important invention of his which they had used.

The meeting was adjourned for the debtor to submit a proposal for payment in full.

If you require anything pertaining to aviation, study "FLIGHT'S" Buyers' Guide and Trade Directory, which appears in our advertisement pages each week (see pages xv and xvi).

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